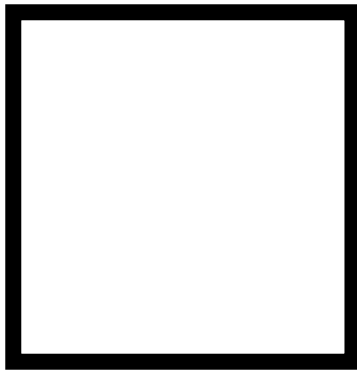


# Appendix

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Noise  
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Waterfront Engineering  
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## Bay to Bay Link Feasibility Study

City of San Diego

Transportation & Drainage Design Division,  
Engineering & Capital Projects  
Redevelopment Agency,  
Community & Economic Development



**DRAFT**

15 August 2003

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## **I. BIOLOGICAL RESOURCES**

### **INTRODUCTION**

The Navigable Channel Alternative could result in both short- and long-term impacts to biological resources, as including both habitats and specific species. The vast majority of the study area is developed and does not support sensitive biological resources. Sensitive resources do occur in the San Diego River and San Diego and Mission bays, however, which could be directly affected by construction activities in these areas. Indirect impacts to sensitive species could occur as a result of construction noise adjacent to wetland habitats. Indirect impacts to biological resources also could occur through discharge of hydrocarbons, other construction materials and other pollutants, as described above under water quality.

Over the long term, a potential impact has been identified with regard to potential habitat changes. Concerns related to this topic include mixing waters of various salinities and pollutant profiles, as well as draining water from wetland habitats as a result of dredging activities in adjacent areas. The potential increased human presence, particularly the noise of small, motorized watercraft, also could affect sensitive wildlife species. The potential spread of exotic species of plants and animals also is of concern. Landscape plans should contain native species in order to reduce the spread of exotic species.

#### Habitats

Although the portion of the San Diego Bay within the study area is bordered by rip-rap and disturbed habitat; there is potential for eelgrass to occur on the floor of the bay. The lower San Diego River supports various types of wetland habitat. Wetlands are considered sensitive by local, state and federal agencies (City of San Diego 1990; County of San Diego 1991). Wetland habitat is defined by certain hydrological, vegetation and soil criteria. The EPA and U.S. Army Corps of Engineers (ACOE) definition of wetlands is “Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

The U.S. Fish and Wildlife Service (USFWS) defines wetlands as:

...lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin et al. 1979).

Wetland habitat is naturally limited, and remaining areas provide important island habitats for migrant birds. Other important wetland functions include flood conveyance, flood storage,

sediment control, providing surface water and insects for fish, amphibians and birds, spawning grounds for aquatic fauna, habitat for rare and endangered species, corridors for wildlife movement and control of water quality and erosion. Oberbauer (1991a) reports a reduction of 91 percent of freshwater marsh and a reduction of 68 percent of coastal salt marsh in San Diego County since the pre-European era. Given their sensitivity and level of loss, impacts to such habitats are considered significant. The sensitivity of the San Diego River channel in the study area has been recognized by the City through its designation as the Mission Bay Park Southern Wildlife Preserve and inclusion in the preserve established under the City's Multiple Species Conservation Program (MSCP).

The functional wetland roles of estuarine and other wetland systems include:

- hydrology, including flood control and shoreline protection
- food chain support and nutrient cycling
- provision of habitat for biotic organisms, providing surface water and insects for fish, amphibians and birds, spawning grounds for aquatic fauna, habitat for rare and endangered species, corridors for wildlife movement and control of water quality and sediment control

Potential construction and operation impacts to estuarine systems include filling; fragmentation; degradation of water quality from agricultural contaminants (fertilizers and pesticides) and sanitary effluent; the upstream channelization of riverine systems and construction of dams and culverts and appropriation of water which alters the amount of fresh water input into estuarine systems; increase in runoff from urban development due to increases in impervious surfaces; the closure of mouths of highly marine-influenced estuaries because of artificial barriers or sandbars which prevent tidal flushing; the artificial opening of highly freshwater-influenced estuaries that changes the natural water and salinity regimes of these estuaries; and the invasion of exotic plant species which displace native plant species (Ferren 1990). Specifically in southern California, wetland alteration has been accomplished by a variety of mechanisms including filling, draining, clearing of vegetation, water diversion projects, impoundment projects, increasing or decreasing nutrient levels within a system, grazing, channelization, increased sediment loading, lowering of water tables, human recreational activities, gravel mining, proliferation of exotic species and urban development (Bowler 1990).

#### Sensitive Habitats

Sensitive habitats are located within the San Diego River (see Figure BR-1) and bay portions of the proposed project area.

*Saltwater Wetland Complex.* Saltwater wetlands dominate the lower San Diego River portion of the project (Figure BR-1). Included within this category are open water, intertidal mudflats, sandbars, and coastal salt marsh. Coastal salt marsh has adapted to higher soil salinity levels and frequent inundation by water. Typical plant species include seablite, glasswort, and cord grass. There is also a freshwater influence in this area that has allowed brackish marsh species (e.g., southwestern spiny rush) to grow here. This habitat provides food and shelter to a wide variety of animals, including several sensitive birds and animals (e.g., least tern, Belding's savannah sparrow, light-footed clapper rail and the salt marsh yellowthroat).

In addition to the vegetated wetland habitats within the lower San Diego River, there are also unvegetated areas consisting of open water, mudflats and sandbars that comprise regionally important wildlife habitat. Resident and migratory waterfowl use these habitats for foraging and loafing.

*Eel Grass Beds.* Eel grass (*Zostera marina*) stands shelter spawning herring and other fish, provide food and hunting grounds for shorebirds and filter dangerous pollutants. These are known from both the San Diego and Mission bays.

### **Sensitive Species**

A number of sensitive bird species are known from the area.

#### **Light-footed clapper rail** (*Rallus longirostris levipes*)

**Status:** Federal- and State-listed Endangered, Fully Protected

**Distribution:** A very localized, year-round resident in central and southern California; Baja California, Mexico; and the Gulf of California.

**Habitat(s):** Saltwater and brackish marshes.

**Status on site:** Known from lower San Diego River.

#### **California least tern** (*Sterna antillarum browni*)

**Status:** Nesting colony Federal- and State-listed Endangered, Fully Protected

**Distribution:** Fairly common but local resident along the coast (San Luis Obispo County, south), casual spring and summer visitant to the Salton Sea.

**Habitat(s):** Nests on open sandy or gravelly shores (and occasionally on artificial surfaces); forages around bays, estuaries, tidal channels and harbors.

**Status on site:** Forages in open water of both San Diego River and Bay. Known breeding colony on Mariner's Point (Mission Bay). Historic and potential nesting sites occur adjacent to and north of San Diego River.

#### **Western snowy plover** (*Charadrius alexandrinus nivosus*)

**Status:** Federal-listed threatened; California Species of Concern (CSC)

**Distribution:** Year-round resident from coastal southern Washington to southern Baja California. Found inland at Mono Lake and the Salton Sea.

**Habitat(s):** Sandy or gravelly shores along bays and estuaries, salt ponds. Nests on ground, often with little or no cover.

**Status on site:** Known to breed at Mariner's Point. Forages (and potentially breeds) in the San Diego River.

#### **American peregrine falcon** (*Falco peregrinus anatum*)

**Status:** State-listed Endangered

**Distribution:** Until 1950, only a few pairs nested in San Diego County. Still occurs in southern California as a rare visitor, primarily along the coast where it feeds on waterfowl.

**Habitat(s):** Open grasslands and scrublands, cliffs and steep terrain, sometimes urban areas. Often found along the coast or near lagoons and ponds where waterfowl gather.

**Status on site:** Forages on shore birds in the San Diego River.

**Belding's savannah sparrow** (*Passerculus sandwichensis beldingi*)

**Status:** Federal Species of Concern, State-listed Endangered

**Distribution:** From Goleta in Santa Barbara County south to El Rosario, Baja California, Mexico.

**Habitat(s):** Salt marshes around coastal lagoons dominated by pickleweed (*Salicornia* spp.).

**Status on site:** Known from lower reach of San Diego River; breeds within the river channel.

Several other sensitive wildlife species are known or potentially occur in the lower San Diego River portion of the project.<sup>1</sup> These are California Special Concern species and are only regarded as sensitive where they breed. These species are not expected to breed in the project area and therefore would not be a constraint to project development.

**Park System Linkage Concept Alternative**

This alternative would avoid any direct impacts to sensitive habitat or species, as it would occur entirely in areas that are developed and do not support sensitive resources. There is some potential for indirect impacts to sensitive species in the San Diego River due to demolition/construction activities in the vicinity. These activities would, however, be separated from the river by Interstate 8, and changes near San Diego Bay would be minimal, so impacts would likely not be assessed as significant in the context of the existing conditions. As described above, this alternative would result in some short- and long-term water quality impacts; runoff would, however, be filtered before reaching sensitive biological resources. There is some limited potential for use of proposed park areas by common wildlife; this would not, however, be regarded as a significant environmental benefit.

Because none of the project elements would occur adjacent to or directly within sensitive habitats, the potential for long-term habitat impacts also would be minimal. No increase in motorized watercraft would occur. No mixing of waters of various salinities or potential for draining of water from wetland habitats would occur. Human presence in nearby habitats also would not be expected to noticeably increase. No invasion of exotic species into sensitive areas would be anticipated, because of the lack of connectivity between areas affected by the project and such areas.

**Non-tidal Channel Concept Alternative**

Similar to the Park System Linkage Concept Alternative, all activities associated with this alternative would be located south of Interstate 8 (and thus buffered from sensitive habitats in the San Diego River) and no changes to the San Diego Bay are proposed. No direct impacts to sensitive habitats would, therefore, occur, and any indirect impacts would be minimal. Runoff associated with redevelopment and landscaping would be filtered before reaching any natural water bodies. Any changes to the hydrologic regime associated with the construction of the proposed channels would be anticipated to be minimal.

There is some potential for the channel and park lands to be used by various wildlife species. This could be assessed as a (relatively minimal) benefit, but would be of concern if the water in the channel became highly polluted due to contaminated runoff, motorized boat usage or seepage

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<sup>1</sup>California brown pelican, American white pelican, double crested cormorant, osprey, long-billed curlew, California gull, and loggerhead shrike.

of contaminated groundwater, and would be limited by the human use of the area. No long-term habitat changes would be anticipated for this alternative. Human use would likely be focused on the channels, and any related increase in human use of nearby habitat areas would be expected to be minimal. Any noise impact related to the use of motorized boats in the channels (which are removed from sensitive habitat areas) also would be minimal.

### **Navigable Channel San Diego Bay to Mission Bay Concept Alternative**

Construction of the channel linking San Diego Bay to the San Diego River could result in significant short- and long-term impacts to biological resources.

Dredging operations within or adjacent to San Diego Bay and the San Diego River could result in impacts to sensitive wetland (saltwater, brackish and freshwater) habitats and their associated species. There is a potential for impacts to eelgrass beds within San Diego and Mission Bays. These impacts would occur if dredging is necessary in eelgrass habitat. Based on preliminary design assumptions of a 100-foot wide channel, impacts to wetland habitats in the lower San Diego River would include approximately 2.0 acres of coastal salt marsh, 0.5 acre of mudflats and 7.6 acres of sand bars. Dredging in the lower San Diego River in areas that currently consist of open water would affect approximately 12.2 acres. This currently is relatively shallow water that supports aquatic vegetation. This vegetation is habitat for small fish, crustaceans and diving birds. Dredging within this habitat for the project will alter the wildlife values within the affected area to a deeper aquatic environment. These impacts could be difficult to mitigate because of their specialized requirements.

These impact numbers are based on a channel design within the San Diego River that is on the north side of the channel in the western project area. This is where a channel already exists and the sand bars are covered by the daily tides. If the channel were located further to the south the project could impact more terrestrial habitats, including sand dunes.

Impacts to wetland habitats (and associated species) could require compliance with a number of state and federal laws, including the Clean Water Act (Sections 10, 401 and 404), California Fish and Game Code (Section 1601), federal Migratory Bird Treaty Act (MBTA), and the state and federal Endangered Species Acts (CESA and FESA). Short-term impacts also could occur as a result of construction activities adjacent to sensitive habitats. Compliance with CESA, FESA and the MBTA to avoid impacts could require seasonal timing constraints for wetland habitat clearing, work corridor surveys for nesting birds and/or construction of noise barriers.

With the exception of the California least tern, the sensitive species known to occur in the study area are associated only with the San Diego River. In addition, the historic nesting grounds of the least tern, which forages in both the San Diego River and Bay, are adjacent to the river and at Mission Bay. Thus, both direct and indirect construction impacts to sensitive species would be much greater in association with activities in the river than in the bay.

There also is a potential for long-term impacts to sensitive biological resources. As noted above, the wetland habitats identified in the study area include saltwater, brackish water and freshwater. These habitats (and their attendant species) have developed in response to specific salinity regimes, and could be affected by changes to them. The salinities of the various portions of

water bodies that would be affected by the project are not known at this time; nor (as noted with regard to water quality) are the flow patterns that would occur under this alternative. Although specific impacts, therefore, cannot be determined without a detailed hydrologic analysis, the effect of mixing of waters of varying salinities on the identified wetland habitats and associated species comprises a substantial area of concern for this alternative. Another potential source of habitat type conversion is the draining of water from wetland habitats as a result of dredging activities in adjacent areas. Historic changes in the vegetation in the San Diego River are evidence of habitat conversions that can result from changes in the hydrologic regime.

As described under water quality, above, this alternative could result in substantial water quality impacts, which could in turn affect sensitive species. The anticipated use of the canal by motorized boats would reduce the value of any wetland habitats created as part of its construction. Increased human presence, particularly the noise of motorized watercraft, also could affect sensitive wildlife species in the channel, San Diego Bay and San Diego River.

Another concern is related to the introduction of exotic plant and wildlife species. Specifically, ships docking in San Diego Bay discharge ballast water carried from distant locales, which contains species non-native to San Diego. A water link could allow these species to move from San Diego Bay into the San Diego River and Mission Bay. Any use of invasive plant species in landscaping adjacent to the channel also could result in the transport of non-native species into sensitive habitats.

#### **Summary Feasibility Comparison**

<b><u>BIOLOGICAL RESOURCES</u></b>	<b>PARK SYSTEM LINKAGE</b>	<b>NON- TIDAL CHANNEL</b>	<b>NAVIGABLE CHANNEL BAY-TO-BAY</b>
Avoid mixing waters of varying salinities	10	10	1
Avoid potential transport of exotic species from discharge ballast water	10	10	2
Avoid direct and/or indirect impacts to wetland habitats and associated species	10	10	1
Minimize construction noise adjacent to wetland habitats	10	9	3
Minimize presence of humans and motorized watercraft adjacent to sensitive habitats	10	10	1
Plant only native species in areas connected to native habitats	10	10	7

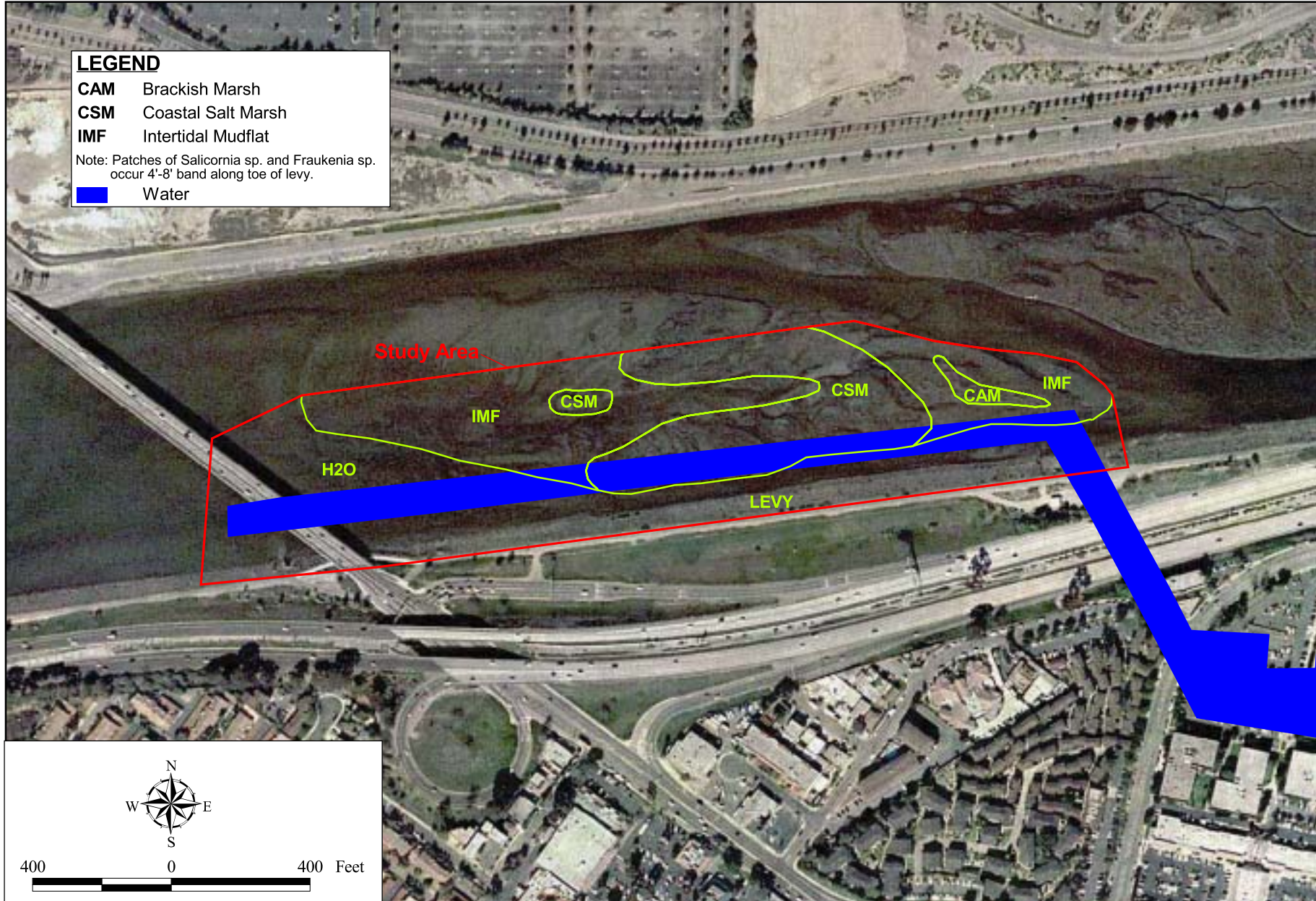
1-3 = low feasibility; 4-6 = moderate feasibility; 7-10 = high feasibility

## LEGEND

**CAM** Brackish Marsh  
**CSM** Coastal Salt Marsh  
**IMF** Intertidal Mudflat

Note: Patches of *Salicornia* sp. and *Fraukenia* sp. occur 4'-8' band along toe of levy.

 Water



Note:

This map is based on site conditions as observed at the time of our field investigations. The information presented herein was developed by visual inspection and/or aerial photograph interpretation. Note that both site conditions and applicable regulatory requirements may change.

## San Diego River Habitats

BAY TO BAY LINK FEASIBILITY STUDY

Figure BR-1

## **II. WATER QUALITY**

### **INTRODUCTION**

The Alternatives for a Navigable Channel and Non-tidal Channel raise several key issues related to effects of project construction and operation on water quality: erosion/siltation, hazardous materials, dewatering, mixing of flows and urban contaminants. These issues are described below.

#### **Erosion/Siltation**

Proposed project grading, excavation and construction activities would increase the potential for erosion and transport of material both within or downstream of construction locales, particularly when they occur at the water's edge. The movement of eroded materials from the project site into downstream receiving waters could produce adverse water quality effects both directly through increased sediment loads, as well as indirectly through presence of small diameter particles (which provide loci for the adsorption of contaminants such as organic and petroleum compounds). Without control, such effects could significantly impair downstream water quality, as well as attendant wildlife habitats and species.

General Construction Activity Storm Water Permits (NPDES No. CAS000002) are required for construction sites where grading exceeds five acres (reduced to one acre on March 13, 2003), or for construction activities resulting in soil disturbances of less than five acres if the construction activity is part of a larger common plan of development. General permit conditions address notifications, prohibitions, effluent limitations, preparation and implementation of a stormwater pollution prevention plan (SWPPP), and monitoring program and record-keeping requirements. Construction activities carried out in compliance with the mandatory permit(s) noted above would result in less than significant water quality effects.

#### **Construction-related Hazardous Materials**

Project construction would involve the on-site use and/or storage of hazardous materials such as fuels, lubricants, solvents, concrete, paint and potentially portable septic system wastes. The accidental discharge of such materials during project construction could potentially result in significant impacts to surface water quality in downstream receiving waters, with certain of these materials (particularly petroleum compounds) potentially toxic to aquatic species in low concentrations. As described above for erosion and sedimentation, an approved SWPPP would be required as part of any alternative's General Construction Activity Storm Water Permit. The SWPPP would be required to address measures to avoid or mitigate effects related to the use and potential discharge of hazardous materials during construction, and would be expected to render potential construction-period impacts related to hazardous materials less than significant.

#### **Dewatering**

According to the Midway/Pacific Highway Corridor Community Plan (City of San Diego 1991, as amended), the existing groundwater table in much of the Midway area is at a depth of less than 25 feet. The Final EIR for the North Bay Revitalization Area (City of San Diego 1998) indicates that the water table is "expected to be near mean sea level for much of the Midway area." It is, therefore, likely that construction activities will encounter shallow groundwater, especially for alternatives proposing creation of a navigable water feature.

The degree to which this would represent a potential issue is dependent upon two factors: (1) the depth of planned excavations and (2) the need to convey water away from the construction area (i.e., whether subsequent construction activities, such as canal lining, are required in the construction area). This is a particular concern because a number of known hazardous materials sites are located in the project area, which could have contaminated the groundwater. An associated concern is the potential to create erosion/sedimentation impacts at the point of discharge. Disposal of extracted groundwater could impact downstream surface water quality (and associated biological habitats) through increased turbidity and the introduction of other contaminants. In particular, any temporary construction dewatering near a known groundwater contaminant plume would have to be designed, operated and coordinated so as not to exacerbate any existing contamination.

If temporary construction dewatering to a surface water body is necessary, a Dewatering Waste Discharge Permit (NPDES No. CA0108707) would be required. These permits are intended to ensure compliance with applicable water quality and beneficial use objectives, and would incorporate applicable best management practices (BMPs) to protect downstream water quality. The California Storm Water Best Management Practice Handbooks (Storm Water Quality Task Force 1993) identify the following types of measures for disposal of extracted groundwater: use of sediment catchment devices, filtering of groundwater prior to discharge (e.g., with gravel and filter fabric media), testing of extracted groundwater for contaminants prior to discharge, and, potentially, treatment of extracted groundwater.

The potential alternative to discharge to a surface water body is discharge to the City's sewer system. In this case, the effluent would need to meet the City's discharge requirements. Depending on the quality of the groundwater, the effluent may require treatment prior to discharge. Discharge of the dewatering effluent to the sewer system would reduce the potential impact to adjacent receiving waters; it is not, however, an efficient use of the sewer system. Compliance with the applicable permit requirements would result in less than significant effects related to dewatering.

### **Mixing of Flows**

Potential impacts could occur related to the long-term mixing of bay waters, ground waters and river flows. Such impacts would result only from alternatives that provide an hydraulic connection from the constructed channel to San Diego Bay and/or the San Diego River (which could in turn result in a hydraulic connection to Mission Bay). These concerns are related to the spread of water pollutants present in the water bodies as well as the mixing of salt and fresh waters.

Under Section 305 of the Clean Water Act, each state is required to periodically assess all surface waters within the state. Based on this assessment, each state must submit a list of those waters that do not, or are not expected to, attain water quality standards after application of required technology-based controls. This list, known as the 303(d) list, serves to focus water quality efforts and resources toward the most significant water quality problems. Once listed, the Regional Water Quality Control Board (RWQCB) is mandated to prioritize each waterbody/watershed for subsequent development of total maximum daily loads (TMDLs).

The lower San Diego River is identified on the 303(d) list for chlordane, dissolved oxygen, fecal coliform bacteria, phosphorus and total dissolved solids. Additionally, the list identifies Famosa Slough as “water quality limited” due to eutrophication (high levels of dissolved nutrients, deficient in oxygen). These areas were identified as moderate to low priority for TMDL establishment.

The water quality in the San Diego River likely varies significantly based on the amount of flow in the river (with larger flows diluting the pollutants). Based on data from a U.S. Geological Survey gauging station at Fashion Valley, annual mean flow since 1983 has varied from a low of 13.6 cubic feet per second (cfs) in 1999 to a high of 118 cfs in 1993. Within this broad range, daily flows are even more erratic, typically near zero, but increasing to approximately 3,000 cfs on several occasions. Additional water quality information is contained in the Final San Diego River Watershed Urban Runoff Management Plan (WURMP) submitted to the San Diego RWQCB January 2003. The draft January 2003 update of the 303(d) list (approved by the San Diego RWQCB on February 4, 2003) contains fact sheets in support of the listings that contain water quality data. Analysis of a composite of four largemouth bass fillets from the San Diego River near Taylor Street in 1999 exceeded the Maximum Tissue Residue Level action levels for chlordane. The remaining water quality data were obtained by Padre Dam Municipal Water District. Dissolved oxygen levels, vital for aquatic life, were below the Basin Plan objective in 90 percent of samples taken in 1997 and 2000. Sampling in 2000 showed fecal coliform levels exceeding standards in 70 percent of the samples. Phosphorus concentrations exceeded the Basin Plan objective in 75 percent of samples in 1997 and 2000. Finally, 48 percent of water samples taken along Fashion Valley Road between 1997 and 2000 exceeded the Basin Plan objective for total dissolved solids; sampling showed a seasonal and increasing trend over the three-year period.

Based on bioassessment data for the San Diego River watershed gathered by the California Department of Fish and Game between 1997 and 2001, the benthic communities are moderately to substantially impacted. Levels of diazinon exceeded the California Department of Fish and Game-established level during the three storm events measured in the 2001-2 season. Other exceedances measured during that season were considered potentially associated with isolated events and not necessarily indicative of a persistent problem.

Much of the San Diego Bay also is included in the 303(d) list, and was identified as a high priority for TMDL development. Various areas in the northern portion of the bay are identified as having degraded benthic communities, sediment toxicity, dissolved copper and/or bacterial indicators. Finally, Mission Bay is included on the 303(d) list for eutrophication, lead and high coliform count. The first two were identified as medium priority for TMDL establishment, with coliform being assessed as a low priority. Detailed water quality data are not readily available for these two water bodies.

Mixing these waters of various pollutant profiles could further degrade their respective water qualities. If the water bodies are connected, it is anticipated that it would be extremely difficult to filter flows or keep the water from mixing.

### **Generation of Urban Contaminants**

Development associated with the proposed project (e.g., turf and parking lots) could result in the long-term generation of contaminants. The transport of urban contaminants from project facilities to downstream receiving waters could result in significant impacts to water quality (and attendant species) over the long term. The project would be required to conform to NPDES municipal storm water and urban runoff guidelines (NPDES No. CA0108758, RWQCB Order No. 2001-01), including the Standard Urban Storm Water Mitigation Plan (SUSMP) and/or specific implementation criteria for those guidelines currently under development by the City of San Diego. Specifically, this order requires new development (and redevelopment projects) to meet (among other criteria) a number of numeric and qualitative standards related to water quality and runoff discharge. The SUSMP identifies a number of post-construction or permanent best management practices (site design features and stormwater treatment devices) intended to protect and enhance the water quality of the region's surface waters. These measures are separate from the construction-related requirements discussed above, and remain operational once the site is in use. The SUSMP requires development of project-specific Water Quality Control Plans to identify pollutants of concern and applicable requirements. Compliance with the applicable standards would be expected to reduce operational impacts to below a level of significance.

The Limited Hazardous Materials Technical Study (HMTS Ninyo and Moore 2002) reviewed the study area and a 200-foot search radius including residential neighborhoods as well as light industrial and commercial districts. Database search and field reconnaissance resulted in identification of 107 properties of potential environmental concern within the search area, which includes schools, hospital and dental facilities, a post office, dry cleaning facilities, service stations and car washes, and printing and photo development facilities. Eliminating closed cases, duplicate records and sites actually located more than 200 feet beyond the study area boundaries the HMTS identifies spills including (but are not limited to) gasoline, oil, transmission fluids and detergents as determined by soil and groundwater samples collected through soil borings. Currently, all but 10 leaking underground storage tank (LUST) facilities located within the study area have completed mitigation for these known hazardous material spills. Typically, mitigation included excavating all contaminated soil, disposing of contaminated soil appropriately, and installing plastic liner and/or concrete slurry walls prior to backfilling the excavated area with clean, imported fill. Several of these facilities converted soil boring sites into soil/groundwater monitoring wells for the duration of remediation.

The HMTS concludes that the remaining 10 LUST sites within the study area are considered an environmental concern to the study area and that there is a moderate to high potential of encountering contaminated soil or groundwater.

The HMTS also identifies two landfills within the search area: the Mission Bay Landfill and the Sports Arena Landfill. The Mission Bay Landfill, located within the search area but north of Interstate 8, is considered a potential environmental concern. Subsurface investigations on the Sports Arena Landfill site have not been performed, however, and the site is considered a potential environmental concern.

It should be noted that each site was assessed and rated as a potential environmental concern individually. Cumulative impacts should also be considered.

### **Park System Linkage Concept Alternative**

By foregoing construction of a channel, this alternative would minimize impacts related to erosion, sedimentation and the need for dewatering. The potential for some impacts related to these issues would, however, exist because of the (relatively limited) grading required in association with redevelopment and creation of public open space/park lands. The potential for contamination from construction-related hazardous materials also would exist, but the duration of this hazard would likely be somewhat less than with the other two alternatives. Although a potential exists for sediment and construction-related hazardous materials to drain to the San Diego Bay or River through storm drains, this would be limited because the project would not be directly connected to these sensitive water bodies. Because project-related grading would exceed five acres, the General Construction Activity Storm Water Permit, with associated measures to minimize potential water quality impacts, would be required as described above.

The absence of the channel in this alternative would substantially limit the amount of potential dewatering required, but some could still be expected in association with the above-noted grading activities. It is considered unlikely that any groundwater encountered would be directed to surface water bodies, because of the project's isolation from them. Under this alternative, it is more likely that the anticipated minimal amount of groundwater encountered would be directed to the City's sewage system, with the associated requirement that the effluent meet the City's discharge requirements, thus minimizing any potential impacts. This alternative also would eliminate the potential for mixing of bay waters and river flows, and associated potential impacts.

This alternative would result in the generation of urban contaminants associated with redevelopment (although likely not substantially different from existing conditions) and landscaping of the public open space/park lands. As noted above, the transport of these contaminants would be somewhat limited because there would be no direct connection from the project to sensitive water bodies. The project also would be required to implement measures to comply with NPDES and associated City requirements regarding water quality and runoff discharge.

### **Non-tidal Channel Concept Alternative**

Grading/excavation associated with redevelopment, public open space/park lands and two channel systems would result in a potential for erosion/sedimentation. The potential for contamination from construction-related hazardous materials also would exist from the construction activities. Similar to the situation described above for the Park System Linkage Concept Alternative, the potential for transport of sediment and contaminants would be limited because the project would not be directly connected to sensitive water bodies. The overall potential for contamination would, however, be greater than with the Park System Linkage Alternative because of the amount of construction involved and the associated length of the construction period. Because project-related grading would exceed five acres, the General Construction Activity Storm Water Permit, with associated measures to minimize potential water quality impacts, would be required as described above.

This alternative would result in the potential need for dewatering associated with grading activities, particularly channel creation. This would be of particular concern in areas containing hazardous materials.

Disposal of effluent in this situation could be problematic as the additional flows of dewatering groundwater could strain the sewer system. Regardless, water quality standards would need to be met, which would minimize any potential impact but could be difficult to achieve.

Similar to the Park System Linkage Concept Alternative, this alternative would result in the potential for the generation of urban contaminants associated with redevelopment and landscaping. There would be somewhat less park land (and presumably landscaping) associated with this alternative than with the Park System Linkage Alternative due to presence of the channel rather than greensward. As noted above, the project would be required to implement measures to comply with NPDES and associated City requirements regarding water quality and runoff discharge. Any water quality issues associated with the channel (including potential for seepage of contaminated groundwater) would be relatively contained, as the channels would not be connected to any existing water bodies.

#### **Navigable Channel San Diego Bay to Mission Bay Concept Alternative**

This alternative would result in the greatest potential water quality impacts of the alternatives reviewed because of both the extent of grading/excavation and the fact that it would directly connect to both San Diego Bay and the San Diego River. Although construction-related hazardous materials employed are assumed to be similar under any of the alternatives, they are assumed to be present over a longer duration with this alternative due to the extent of required construction activity. Urban contaminants actually generated by this alternative may be somewhat less with regard to landscaping than the other alternatives, but would involve potential for boating contaminants that would not occur with the other alternatives. The connection to sensitive water bodies could result in the channel being a conduit for sediment, construction-related hazardous materials and urban contaminants (both those associated with the project and those generated by surrounding activities) that would be difficult to filter.

The depth required for the tidal channel would increase the potential for dewatering activities to be required in association with excavation. The potential for this to occur in areas subject to existing groundwater contamination results in concerns associated both with construction and with long-term seepage into the channel (and transport to adjoining water bodies).

As noted in the discussion above, a major concern (and one associated only with this alternative) is associated with the channel's connectivity to, and mixing of flows between, the San Diego River, Mission Bay and San Diego Bay. The connection between San Diego River and San Diego Bay would be direct; although there is a jetty between the San Diego River channel and Mission Bay, it is possible that there would be some flow between the two related to tidal action. As described in the general discussion above, each of these water bodies is included on the list of impaired water bodies due to existing pollution. Each, however, has distinct pollution issues not currently shared by the other water bodies (e.g., phosphorus and chlordane in the San Diego River, sediment toxicity and dissolved copper in the San Diego Bay). The mixing of flows, therefore, could exacerbate the existing water quality issues in these areas, and further degrade their ability to support the designated beneficial uses related to recreation and wildlife habitat.

Given the relatively small amount of the San Diego River that lies downstream from the proposed connection point, it is possible that water quality impacts there could be relatively minimal; it also is possible, however, that flows could create a backwater that would affect some upstream areas of the river as well. Also, differences in net tidal flow between the two bays would have to be controlled to avoid scouring and associated turbidity. Determination of the direction, amount and rate of flow, as well as how far it would extend into each of the water bodies, would require a hydrologic analysis. This in turn would allow a more detailed assessment of the potential water quality impacts associated with this alternative. In the absence of this detailed assessment, water quality impacts are considered a potentially severe constraint to implementation of this alternative.

If a channel were connected only to San Diego Bay and not broken through to the San Diego River, impacts from mixing of flows between the two water bodies would be avoided, thereby substantially reducing anticipated impacts. The water in the channel would, however, be contaminated by flows from the Bay, and there would remain some potential for transfer of polluted groundwater to the Bay. These potential concerns are much less severe than those associated with a connection of the two waterbodies.

**Summary Feasibility Comparison**

<b><u>WATER QUALITY</u></b>	<b>PARK SYSTEM LINKAGE</b>	<b>NON- TIDAL CHANNEL</b>	<b>NAVIGABLE CHANNEL BAY-TO-BAY</b>
Avoid water quality impacts related to mixing of flows between water bodies	10	10	1
Avoid erosion and transport of material to water body receptors, particularly at water's edge	7	6	1
Avoid discharge of construction-related hazardous materials	6	5	1
Minimize need to dewater construction site, particularly in areas with contaminated groundwater	7	3	1
Avoid long-term generation/ transport of urban contaminants	6	6	4

1-3 = low feasibility; 4-6 = moderate feasibility; 7-10 = high feasibility

### **III. NOISE**

#### **INTRODUCTION**

The City's standard for exterior noise level compatible with residential and other noise-sensitive uses (schools, day care facilities, hospitals, libraries and parks) is 65 A-weighted decibels (dBA) Community Noise Equivalent Level (CNEL) for useable outdoor living space. The maximum acceptable exterior noise level is 70 dBA CNEL for businesses and professional office uses, and 75 dBA CNEL for industrial and commercial uses. Interior noise levels for new residences, hotels and motels are not to exceed 45 dBA CNEL; they are not to exceed 50 dBA CNEL for business and professional office uses. These noise levels are already exceeded in some parts of the community as a result of traffic and aircraft noise.

Residential uses in or immediately adjacent to the study area primarily occur in the areas generally bounded by Hancock and West Mission Bay Drive, north of Sports Arena Boulevard; south of Meadow Grove Drive, west of Rosecrans Street; and Rosecrans Place, Sellers Drive/Upshur Drive and Barnett Avenue. Other sensitive receptors identified within the study area are associated with Dewey Elementary, St. Charles Borromeo Academy, County Health Services (including the County Psychiatric Hospital), Point Loma Convalescent Hospital, Sharp Cabrillo Hospital and Midway Adult School. There also are several hotels/motels along Rosecrans Street and Midway Drive. Other sensitive receptors within approximately one-half mile of the study area include Barnard Elementary School, Plumosa Park, Mission Bay Park and Sail Ho Golf Course.

#### **Construction Impacts**

Construction activity has the potential to impact (on a short-term basis) sensitive receptors adjacent to individual construction sites. The impact of construction noise would depend on the type of equipment being used and distance to sensitive receptors. Construction equipment typically generates intermittent noise from 70 dB to 105 dB at a distance of 50 feet. The City's Noise Ordinance controls noise produced by construction activities. Construction activities are prohibited between the hours of 7:00 p.m. and 7:00 a.m., and on Sundays and legal holidays, except in case of emergency. Construction noise must not exceed an average sound level of 75 dB at the property line of any property zoned for residential use during the 12-hour period from 7:00 a.m. to 7:00 p.m. This may be accomplished by limiting the hours of construction in any one area or erecting temporary noise walls. Compliance with the ordinance would avoid any significant impacts.

#### **Long-term Impacts**

Long-term noise impacts could result from the increased use of the proposed project area. For example, skateboards and loud conversations could occur in proposed public park areas adjacent to sensitive receptors where public use is currently limited. Motor boats could introduce an entirely new category of noise to portions of the study area currently widely separated from the bay. Changes in roadway alignments and traffic patterns also would have the potential to result in noise impacts; detailed modeling would, however, be required to assess such impacts, and they are not addressed here.

**Park System Linkage Concept Alternative**

Demolition/grading/construction activities associated with this alternative would be limited compared to the other alternatives, as they would not include excavation of channels. Some activities would, however, occur adjacent to existing residential and other sensitive receptors, some of which are planned to remain and others of which are planned to be replaced by other land uses. For those sensitive receptors in areas that are proposed for redevelopment (e.g., Sharp Cabrillo Hospital, residential uses between Sports Arena Boulevard and Midway Drive), impacts would depend on the relative timing of the end of those uses and the surrounding redevelopment. Demolition/grading/ construction activities adjacent to remaining sensitive receptors (e.g., uses surrounding existing multi-family residential uses west of Hancock Street changing from primarily industrial to multiple use and open space) would result in relatively short-term noise impacts.

The land uses proposed adjacent to sensitive receptors would not be major noise generators relative to existing conditions. Specifically, the residential area just west of Hancock Street would have multiple use and open space/park adjacent to it rather than the existing industrial uses. The land uses around Gateway Village and St. Charles Borromeo Academy would be essentially the same as they are currently, with some additional open space to the south. Uses surrounding Dewey Elementary also largely would remain the same, with some additional open space along its northwestern and northeastern boundaries. Although these new areas of open space adjacent to sensitive receptors would not be expected to be major noise generators, they would result in public access (and associated potential for noise from activities such as skateboarding and loud talking) to areas that are currently subject to minimal public activity. This would be potentially balanced out by the removal of existing adjacent industrial uses. Most of the other sensitive receptors in the area would be phased out as part of the redevelopment plan.

**Non-tidal Channel Concept Alternative**

This alternative would result in substantial amounts of noise associated with demolition, excavation of two channel systems and construction. It is assumed that structures housing sensitive receptors adjacent to the proposed channel areas would be demolished prior to initiation of excavation activities. Provided that this is the case, the only noticeable difference between this alternative and the previous alternative would be a short-term difference associated with the portion of the channel closest to the apartments west of Hancock Street (a distance of approximately 700 feet).

The land use reconfiguration proposed under this alternative essentially would be the same as that described above for the Park System Linkage Concept Alternative. Long-term noise impacts associated with land use adjacency issues would, therefore, also be similar. In addition to these impacts, however, this alternative also would result in noise generation associated with small, motorized boats (e.g., flat-bottomed tourist boats). Noise levels associated with the use of such watercraft are anticipated to be compatible with the surrounding proposed multiple use and light industrial/research campus designations.

**Navigable Channel San Diego Bay to Mission Bay Concept Alternative**

This alternative would result in substantial amounts of noise associated with demolition, channel excavation and construction activities. In particular, noise impacts to the remaining multi-family residential areas would be exacerbated by channel excavation (and, in the case of Gateway Village, bridge construction) immediately adjacent to them. This also could negatively affect St. Charles Borromeo Academy. Effects on Dewey Elementary would be slightly increased over the other alternatives, due to excavation of the channel approximately 300 feet away.

The amended Community Plan indicates that the bay-to-bay channel is envisioned to be navigable by small, motorized water craft (e.g., water taxis and private ocean-going motorized boats). The motors from these boats could potentially result in long-term noise impacts adjacent to the above-noted sensitive receptors, as well as to the mixed-use areas surrounding the channel. (The potential to have motor boat usage limited to certain hours would substantially alleviate negative aspects associated with this potential use, and should be reviewed.) This alternative also would include additional open space (relative to the other two alternatives) immediately north of Gateway Village. The channel and associated public open space network would result in substantial public use of areas adjacent to sensitive receptors that currently receive limited public use, with associated noise impacts.

**Summary Feasibility Comparison**

<b><u>NOISE</u></b>	<b>PARK SYSTEM LINKAGE</b>	<b>NON- TIDAL CHANNE L</b>	<b>NAVIGABLE CHANNEL BAY-TO- BAY</b>
Minimize construction noise impacts on sensitive receptors	6	5	4
Minimize public access to areas where public access is currently limited	6	6	4
Minimize noise impacts associated with motorized water craft near sensitive receptors	10	7	3

**1-3 = low feasibility; 4-6 = moderate feasibility; 7-10 = high feasibility**

## IV. VISUAL QUALITY

### INTRODUCTION

The project area is located in a long-term urbanized portion of the City. Located just west of the juncture of two major interstates that serve San Diego region residents and visitors, the area is reflective of both its nature as a primary entrance/exit point to these freeways (containing numerous drive-through and sit-down restaurants, hotels, shopping centers, strip malls and a primary recreational feature in the Sports Arena—as well as their attendant parking lots or structures), as well as the mix of uses expected in an urban area that has developed over time with various development goals (single family dwellings, apartments, institutional uses such as postal facilities, military and/or medical facilities and schools), pocket parks, etc. These uses vary in every detail: architectural style, height, footprint size and setback from abutting roadways. Some of the most visually “dis-jointed” uses, the commercial uses that vary from individual store-front to big-box, uses are located along the most heavily traveled (and therefore viewed) thoroughfares: Sports Arena Boulevard, Rosecrans Street and Midway Drive. Because of their varied use and construction timeframe, there is no cohesive visual effect in the overall area (although some continuity is present in areas of contemporaneous and focused development, such as at NTC). When one drives or walks on the public roadways in the study area, there is a substantial amount of visual “noise” and few streetscape focal points in the way of public landscaping.

Geographically, the project area approaches a low of sea level at its northern and southern extents along the San Diego River and San Diego Bay, and traverses low-lying areas associated with the early San Diego River course and floodplain for the remainder of its extent. Views out of the area focus on adjacent hills associated with the mesas to the east (where the Presidio on the south and the University of San Diego on the north provide visual landmarks) and the hills of Point Loma to the west.

### Key Observation Points

The visual sensitivity analysis associated with this feasibility study focuses on potential effects to views enjoyed from public vantage points.

Parks in the vicinity of the study area include Old Town State Historic Park (including associated Presidio Community Park), Mission Bay Park and Plumosa Park. These parks and area roadways represent the primary public viewpoints of the project area. As most of the land surrounding the study area is relatively flat, views are typically short-distance. Plumosa Park, for example, is a depression surrounded by residences, and provides no views to the surrounding area. Sail Ho Golf Course, situated at the southeast corner of Rosecrans and Lytton Streets, immediately abuts the study area. The course slopes down away from the roads, and views are primarily directed toward the adjacent historic MCRD structures. Views to/from the road are partially screened by fencing and mature vegetation. Other notable visual features within the study area include the historic Loma Theatre (converted to a bookstore) and Dewey Elementary School.

Although Presidio Community Park is at a higher elevation, views of the project area are generally obscured by intervening rooftops, mature vegetation inside the park and beyond (palm

trees and silk oaks), terrain and freeways (elevated Interstates 5 and 8) from most roadway and greensward areas within the park. It is also expected that most users are focused on near distance views provided to park users by park amenities (the various statues, pergolas, structures and picnic/landscaped areas provided by the City for park users).

Clear views toward the project area are available, however, from some points within the park, and it is expected that these views would be observed by users looking toward the distant hills and ocean to the west. The viewer sees a clearly mixed use setting in the area between the park and the primarily residential uses along Point Loma, with a number of primary visual elements predominating because of their size and/or atypical nature, which draws the eye. These features include portions of Interstate 5 and Interstate 8, the long linear river channel trending westerly to the ocean, Lindbergh Field and large-scale industrial structures abutting Pacific Highway. In these views to the western horizon, the Sports Arena complex provides a focal point within the project area that draws the eye because of its large size, unusual round shape and lack of abutting (screening) uses due to the surrounding parking lot.

Portions of Sports Arena Boulevard and Rosecrans Street (between the Midway Community and the Old Town Transit Facility) are identified by the City as designated scenic routes. The amended Community Plan calls for installation of appropriate landscaping for both streets, as well as reinforcement of pedestrian-oriented amenities for Rosecrans. A more general policy is to improve the visual quality of the existing roadway system overall.

Urban design guidelines identified in the Community Plan include a focus on pedestrian paths and activity areas:

reinforced by providing benches, tables, overhead sun trellis, fountains, and decorative paving. Large unbroken areas of concrete or paving should be avoided; patterned paving related to architectural elements should be used to break up monotonous areas.

Pedestrian linkages should be provided throughout and between shopping areas, parking lots and all public rights-of way (City 1991:61).

Unification of streetscape through use of standard street trees and landscaping is also recommended. Specific recommendations are included in Appendix B of the Community Plan for a number of area roadways, including the three major thoroughfares in the project area. Although some planting is already present, City proposals for the area are provided here both as guidelines both for: (1) augmentation of existing planting where appropriate, and (2) development of potential new landscaping plans associated with the proposed Bay to Bay project alternatives. For Sports Arena Boulevard, eucalyptus, sycamore and holly oak are suggested, to be used in both linear and clustered formats along landscaped parkway and median features. Medians are additionally to be planted with a combination of trees, groundcover and low shrubs. Washington robusta is proposed for Midway Drive, using the same planting scheme. For the Midway medians, landscaping should include low shrubs or a combination of shrubs and decorative hardscape. Along Rosecrans Street, queen and king palms are recommended in a linear planting format. The Rosecrans medians would be the most varied, as they should contain low-lying shrubs or trees, or a combination of shrubs, trees and decorative paving. At this time a landscape plan is not available for review. It is anticipated, however, that the landscape plan will

be developed in accordance with the new City Streetscape Design Guidelines, and that project effects would be beneficial.

### **Short-term Impacts**

Short-term impacts to visual quality could occur related to demolition and construction activities in the area. This could include the presence of unsightly features such as construction equipment and fencing. It also potentially could include views being temporarily blocked by the installation of construction noise barriers.

### **Long-term Impacts**

In the long term, some views could be opened up by the removal of existing structures. The replacement of large parking lots (such as at the Sports Arena) by structures, landscaping and/or water features would improve the quality of the view from Presidio Community Park, as well as for drivers along project area roadways. It is assumed that provision of the proposed amenities in any of the alternative designs would provide an opportunity for standardization of visual elements in this part of the City, as well as provision of greensward/park elements that would give the viewer a “visual break” from the mixed and frequently visually competing setting. Some visual continuity would be provided, the elements of which would give area users a refreshing change from the existing business-oriented uses along the major roadways.

The potential need to bridge some project features if water ways are implemented that bisect project area roads would introduce a new element into area viewsapes, and would vary based on width of the water feature bridged and nature of the street for which the bridge is provided (two lane versus a six-lane major or urban arterial, etc.). Currently, it is expected that the base of the bridge will contain an 24-48-inch pavement thickness, and would be surmounted by a 30-inch high protective railing. The guard railing would be perforated or linear in nature, but would be visually “see through” so as not to obstruct area sight-lines any more than resulting from the bridge structural requirements. Although specifics of the ultimate visual assessment will depend in large part on landscaping plans, channel design (as appropriate), and details of bridge design, long-term overall visual effects are expected to be positive in nature.

### **Park System Linkage Concept Alternative**

This alternative would result in substantial construction activities as a result of redevelopment and creation of public open space/park lands. Because the alternative would not involve any single large element, it is presumed that construction activities could be phased over time. Construction would, therefore, likely be a less dominant element of the viewshed at any given time than would be the case with the other two alternatives. Thus, adverse but short-term visual impacts associated with construction would be minimized.

In the long term, as with the other alternatives, views would be improved by the removal of unsightly features (e.g., the Sports Arena and associated parking lot). Large greensward areas would be provided within the property containing the existing Sports Arena as well as along portions of Rosecrans Street and Kurtz Street. The proposed park system would provide a new, aesthetically pleasing element in the community.

### **Non-tidal Channel Concept Alternative**

Each of the channels and its surrounding land uses would likely need to undergo demolition/grading/ construction at roughly the same time (although the two channel systems could be constructed separately). This would result in a relatively large amount of disturbance at one time, resulting in a greater short-term visual impact than the previous alternative.

As noted above, the land use changes associated with redevelopment of the area would result in positive visual effects. The open space and channel systems also would provide aesthetically pleasing elements. Although, bridges could be required over the channels in numerous locations it is anticipated that the visual amenity provided by the water feature would outweigh any potential adverse visual effect resulting from bridge construction. Because these channels would be approximately 30 feet in width it is assumed that these would be generally at-grade crossings that would not require bridge footings located at a substantial distance from the bridged water feature (and thereby requiring the associated height to support the arch). Clearance for bridges for this alternative are proposed to be at least six feet from the mean high water (MHW) surface to the bottom of the bridge. Since these water features are not anticipated to be navigable, bridges would not need to accommodate sizable boats. Although providing noticeable elements within the immediate viewscape, therefore, it is not anticipated that bridges associated with this alternative would comprise visually adverse intrusive elements.

Because the water features associated with this alternative trend along areas both north and south of Rosecrans Street, and would provide recreational and visual amenities exceeding the parkways associated with the Park System Linkage Alternative, it may well be preferred over the lower impact park only scenario.

### **Navigable Channel San Diego Bay to Mission Bay Concept Alternative**

Construction of the channel and extension of Point Loma Boulevard would comprise massive undertakings that would need to occur in a continuous construction process, while redevelopment of the surrounding areas presumably could be phased. In addition, due to the close proximity to sensitive habitats, views to the San Diego River could be blocked by temporary noise walls at certain times of the year. Construction would result in a substantial limited-term visual impact across large portions of the community.

As noted for the other two alternatives, land use changes and the open space/channel system would be anticipated to result in a long-term improvement in the visual environment. The large scale and irregularly shaped water feature proposed for the Sports Arena area would create a new visual amenity that would draw the eye and substantially modify the viewers perception of this part of town. This alternative would, however, require construction of a number of bridges across the proposed channel, which could result in the potential for long-term visual change from existing conditions, the extent of which would depend on their specific design. Bridges constructed for this alternative would require a minimum 15 foot clearance from the MHW surface to the bottom of the bridge. This height allows a variety of boat types to access the inland waterway. Six bridges with this 15 foot vertical clearance are assumed for this alternative. Given the length of the navigable water feature and the relatively small number of bridges (six), it is not expected aesthetic improvements related to implementation of the channel would be

substantially minimized by bridge construction. The overall long-term visual impact of this alternative is considered as positive.

**Summary Feasibility Comparison**

<b><u>VISUAL RESOURCES</u></b>	<b>PARK SYSTEM LINKAGE</b>	<b>NON- TIDAL CHANNE L</b>	<b>NAVIGABLE CHANNEL BAY-TO- BAY</b>
Minimize auto and pedestrian bridges	10	4	1
Minimize visual impacts associated with demolition and construction	8	5	4

1-3 = low feasibility; 4-6 = moderate feasibility; 7-10 = high feasibility

## **V. AIR QUALITY**

### **INTRODUCTION**

Both short- and long-term potential air quality impacts could occur, as discussed below.

Receptors that would be sensitive to air quality impacts are the same as those identified for noise issues, above.

### **Demolition Activities**

Older buildings potentially could contain asbestos in the building materials, which (along with dust) could be released into the environment during demolition activities. Although a number of structures within the study area (specifically on Western Street, Midway Drive, Michaelmas Terrace, Evergreen Street, Madrid Street, St. Charles Street, Pacific Highway) are estimated to be over 45 years of age (Archaeos 2003) many may have been constructed prior to use of asbestos and therefore may not be asbestos-bearing. Additional analysis will be necessary prior to making a determination. If asbestos is present, it would require appropriate handling and disposal via routine demolition procedures developed to adequately deal with asbestos-bearing building materials. Regardless, the redevelopment plans for all of the alternatives are essentially the same; therefore, demolition activities, while potentially resulting in significant but mitigable impacts related to this topic, are not meaningful factors in evaluating the differences between alternatives.

### **Construction Activities**

Construction activities for the proposed project would generate emissions including dust (primarily PM<sub>10</sub>) and diesel-powered heavy equipment (primarily NO<sub>x</sub>). Amounts of construction emissions generally are proportional to the amount of earth movement.

Construction emissions can be abated to a large extent through standard construction practices such as watering, ceasing activity in high winds, use of clean-fueled equipment and properly maintaining equipment.

### **Long-term Impacts**

When traffic congestion occurs at intersections, it can result in the creation of carbon monoxide “hot spots.” The potential for creation of such hot spots related to potential modification of roadways associated with the project alternatives will be evaluated. Specifically, this evaluation will be based on the results of the traffic analyses conducted for the alternatives.

Pending completion of a traffic study it is assumed that reconfiguring the five-way intersection at Rosecrans Street and Sports Arena Boulevard would have an adverse impact upon traffic flow, a potential for increased idling time, and a resultant adverse effect on air quality. Similarly, rerouting of traffic (and the possibility of increased queue times) due to implementation of greensward or water features associated with project alternatives could have adverse long-term impacts on air quality. Pending detailed roadway proposals and levels of services analysis, it is assumed that each of the alternatives could potentially result in an increase in localized hotspots.

### **Park System Linkage Concept Alternative**

This alternative would require relatively limited earth movement compared to the other two alternatives because it would not involve excavation of a channel. In addition, as noted above, it

is likely that activities under this alternative could be phased, such that a relatively small amount of graded land is exposed/construction activity is ongoing at any one time. This would in turn minimize potential air quality impacts related to construction.

**Non-tidal Channel Concept Alternative**

This alternative would result in a larger amount of earth movement than the previous alternative due to the excavation of two channel systems. Also, as noted for visual impacts, each of the channel redevelopment areas would likely require demolition/grading at one time. By decreasing the opportunity for gradual phasing, construction period air quality impacts would be increased.

**Navigable Channel San Diego Bay to Mission Bay Concept Alternative**

This alternative would substantially increase the earth movement requirements relative to the other two alternatives due to the excavation of the large navigable channel. As noted for visual impacts, the opportunities for phasing over time would likely be limited with this alternative, further increasing air quality impacts.

**Summary Feasibility Comparison**

<b><u>AIR QUALITY</u></b>	<b>PARK SYSTEM LINKAGE</b>	<b>NON- TIDAL CHANNEL</b>	<b>NAVIGABLE CHANNEL BAY-TO-BAY</b>
Minimize construction emissions by minimizing the amount of earth movement	8	5	4
Avoid contributing to traffic congestion that could result in “hot spots”	9	■	■

**4-6 = moderate feasibility; 7-10 = high feasibility**

## **VI. CULTURAL RESOURCES**

### **INTRODUCTION**

Cultural resources in the project area are primarily historic in nature, and largely date from the first half of the twentieth century. As noted in the Midway/Pacific Highway Corridor Community Plan (City of San Diego 1991: 9), early maps of Pueblo lands in the vicinity of Old Town show the San Diego River emptying from Mission Valley into the San Diego Bay over land that now comprises the Midway area.

### **Archaeological Resources**

Because of the cycles of flooding and siltation associated with the river trending to outfall in San Diego Bay, early prehistoric sites were largely eradicated or deeply buried. This situation is exacerbated by the amount of ground disturbance associated with historic-period development, which may have resulted in sites being dredged out or filled over. It is possible, however, that archaeological sites may be situated under existing features (older buildings, streets, etc.) located outside of fill areas. The areas surrounding and north of the San Diego River would have provided preferred camping locations for prehistoric inhabitants of the area.

A record search carried out at the South Coastal Information Center shows that with the exception of Old Town, just east of the study area, only six archaeological sites have been recorded within one-half mile of the Bay to Bay study area CA-SDI-42, -52, -10,530H, -14,018H, -14,062H and -15,951). These sites include: a camp site, a rancheria, two historic dumps, remnants of some World War II-period structures, and two historic-period graves. Of these sites, only two are within the potential project area. The campsite, historic graves, one of the historic dumps and the World War II-era structures are all outside of the potential footprint for the project.

Two known sites might be affected by project construction (CA-SDI-10,530H and -52). One is the City dump that was used between 1899 and 1908 in the vicinity of the current intersection of Sports Arena Boulevard and West Point Loma Boulevard southerly to the vicinity of Fordham Street/Wing Street. Historic archaeological material was found at this site during the Mission Bay Sewer Interceptor project. This site is completely beneath existing development and the potential significance of deposits in this site is unknown. The other site in this area was recorded by N.C. Nelson circa 1918 as “Old Rancheria.” The site was described as “a cultivated town block with an old Indian cemetery in one corner. The man who cultivated this ground said that he plowed up several mortars, etc., on the place; and other informants stated that the site was once occupied by an Indian village of 300 inhabitants.” The site is now under Pacific Highway, in the vicinity of Smith and Hancock. A 1990 survey indicated that the site “is possibly buried under or obscured by modern development and no remains could be located.” Impacts occurring to these archaeological resources could be considered significant, and would require mitigation, but would not be expected to result in elimination of an otherwise feasible alternative.

### **Historical Resources**

In the mid-1800s a dike was constructed which diverted the course of the river into the channel of what is now known as the mouth of the San Diego River. This was the first of the major improvements that supported more intensive development of the project area.

In the early 1900s the central Midway area was an identifiable and known location (generally known as Dutch Flats--presumably due to the presence of standing water). Historic photos of the central Midway area show only sand, salt flats and a few isolated structures with virtually no development throughout the 1920s, although the Marine Advanced Expeditionary Base (Marine Corps Recruit Depot) was built along Barnett Avenue in the early 1920s. Prior to the 1930s little development occurred in the marshy salt flats of the Midway area. Major streets included Barnett Avenue, Midway Drive, Rosecrans Street and Sports Arena Boulevard (then Frontier Drive). (The Loma Portal Historic District [comprised of homes west of Rosecrans Street on Dumas, Elliott, Goldsmith, Homer and Ibsen streets] is located just outside the potential project area.)

During World War II, areas along the Pacific Highway were used for numerous wartime factories. Gunnery installations were located in the area and the top of the Convair Plant site was camouflaged to look like a nursery. At that time names associated with WWII such as Midway, Nimitz and Frontier Drive appeared as street names throughout the area. Growth in the area intensified, and by the 1940s the Midway area had become the location of numerous wartime industrial sites, with approximately 4,000 temporary wartime housing units. Some of the first permanent structures in the community appeared in the 1950s, when the triangularly shaped piece of land located at the Rosecrans/Camino Del Rio/I-5 intersection was subdivided and developed.

A records search was conducted at the South Coastal Information Center to obtain records on known area historic structures. The project study area contains a number of structures that are historic due to their age and potential association with (1) significant persons, (2) local, state or nationally important historic events, and/or (3) are contributors to local or National Register historic districts. These include USMCRD, NTC and the Loma Portal Historic District, along with numerous other structures (see Figure CR-1 and Table CR-1). A driving reconnaissance of the project area confirmed that each of the documented structures was still standing. In some cases, the potential for other historic structures (not yet documented but appearing to exceed 45 years of age) was noted. This occurred along Channel Way (three structures), Midway Drive (one structure each in the 2700 and 3500 blocks), Michaelmas Terrace (one structure), Evergreen and Madrid Streets (one structure in each of the 3000 blocks), Saint Charles Street (where the entire 3000 block contains duplicate structures), and Pacific Highway (one structure each in the 4300 and 4400 blocks). Although new historic structures might yet be documented, a substantial level of review has already occurred within this portion of the City. It is not expected that any newly documented resource would result in the elimination of an otherwise feasible alternative. Therefore, although impacts to these structures through removal or structural damage due to vibration associated with project construction activities would be considered significant, they are not expected to determine alternative feasibility.

### **Park System Linkage Concept Alternative**

Impacts to the two known archaeological sites may result from implementation of the Park System Linkage Concept Alternative. A deficient intersection, which might require subsurface upgrades during project implementation is located in the area of the rancheria. The same is true for the vicinity of the old municipal dump. New large greensward areas (that may require

substantial existing structure removal and soil rehabilitation prior to park planting) also are located within portions of the old dump area.

The Park System Linkage Concept Alternative would entail park development in several areas potentially constrained by historical resources. North of the existing boat channel, a linear park feature would abut historical buildings within the former Naval Training Center's "Historic Core" (as designated by the City of San Diego). This alternative also would entail park development along several streets identified as containing historical resources, including Barnett Avenue (most of its length), Rosecrans Street (between Midway Drive and Barnett Avenue) and Midway Drive (near the existing Post Office and between Kemper and Wing Streets). Park development along Pacific Highway and Taylor Street (near Old Town) also could be constrained by historical resources.

#### **Non-tidal Channel Concept Alternative**

Impacts to archaeological sites would generally be the same for this alternative as for the Park System Linkage Concept Alternative listed above. The potential for disturbance to the historic dump is somewhat higher due to a larger proposed park area between Kemper and Fordham streets.

Historical resource constraints associated with the park component of this alternative would be similar to those described for the Park System Linkage Concept Alternative—proposed park areas that impact historical resources occur within the former Naval Training Center property and along the above-listed sections of Barnett Avenue, Rosecrans Street, Midway Drive, Pacific Highway and Taylor Street. The northwestern of the two non-tidal channels (near the existing Sports Arena) would not affect known historical resource constraints. The southeastern of the two non-tidal channels could affect buildings that front a segment of Pacific Highway identified as containing historical resources.

#### **Navigable Channel San Diego Bay to Mission Bay Concept Alternative**

This alternative potentially would be the least impactful to known archaeological resources. Potential effects to the rancheria would be the same as for the other two alternatives, and potential effects to the dump would be lessened over the other scenarios as less greensward is proposed in this area for the Navigable Channel scenario.

Historical resource constraints associated with the park component of this alternative also would be similar to those described for the Park System Linkage Concept Alternative. The navigable channel would be located near the above-noted "Historic Core" of the former Naval Training Center, and it would traverse a block of Rosecrans Street identified as containing historical resources. The majority of the channel, however, would be located in areas not known to contain historical resources.

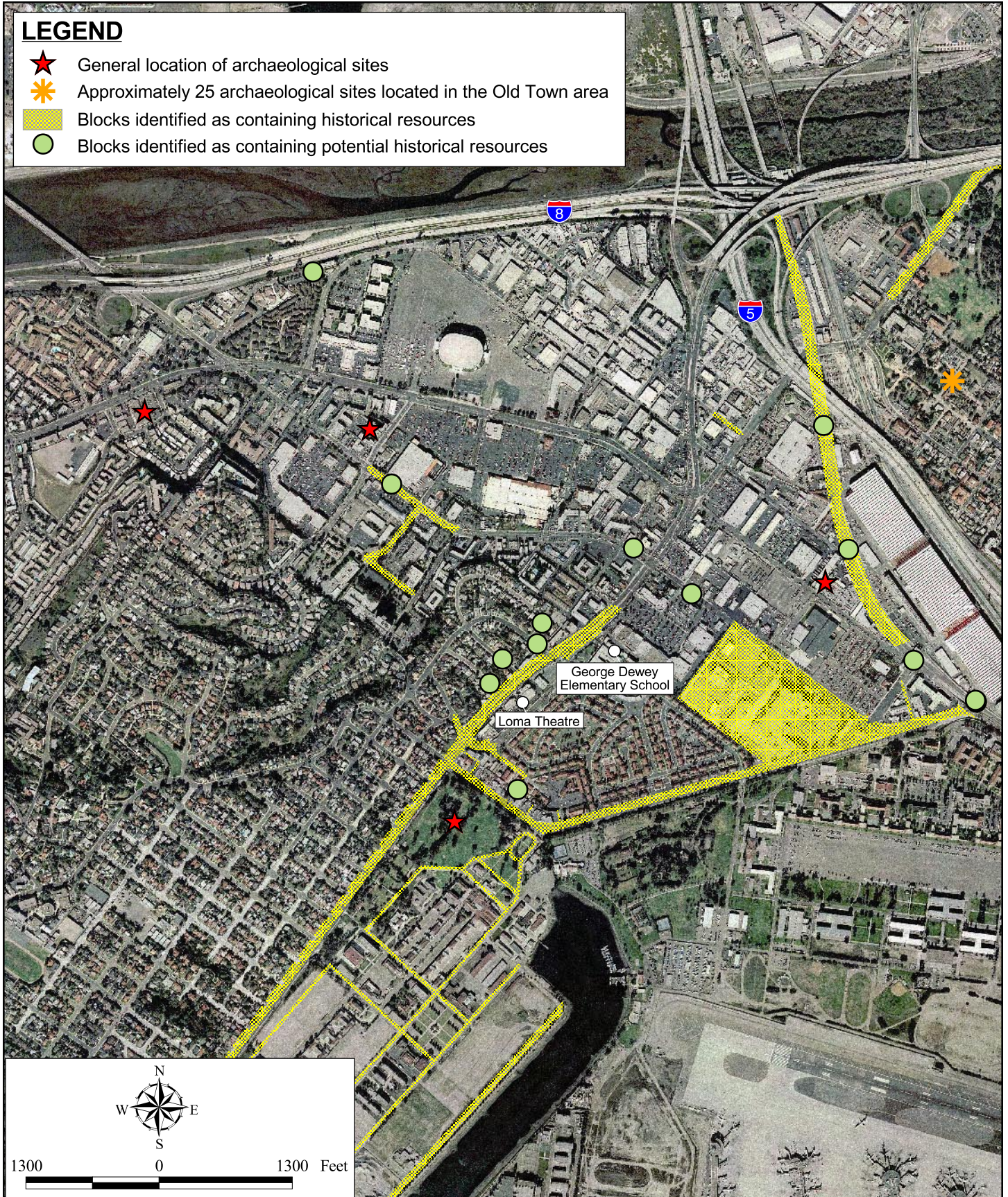
**Summary Feasibility Comparison**

<b><u>CULTURAL RESOURCES</u></b>	<b>PARK SYSTEM LINKAGE</b>	<b>NON-TIDAL CHANNEL</b>	<b>NAVIGABLE CHANNEL BAY-TO-BAY</b>
Avoidance of Historic Structures	5	5	5
Avoidance of Archaeological Sites	9	9	9

**4-6 = moderate feasibility; 7-10 = high feasibility**

## LEGEND

- ★ General location of archaeological sites
- ✱ Approximately 25 archaeological sites located in the Old Town area
- Blocks identified as containing historical resources
- Blocks identified as containing potential historical resources



## Historically Constrained Loci

BAY TO BAY LINK FEASIBILITY STUDY

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## VII. WATERFRONT AND CIVIL ENGINEERING

### ALTERNATIVE 1 – NAVIGABLE CHANNEL

#### Dredge Channel

Assumptions: (1) Average ground elevation is +10 ft MLLW. (2) Dredging depth to -7 feet MLLW (17 feet). (3) The approximate main channel length is 6,600 linear feet with an average width of 50 feet. This channel opens to a large basin in the northern part of the project. This large basin is approximately 862,000 square feet in size (approx. 19.8 acres). This large basin is for a marina and other boat slips. The table below outlines approximate channel length (center line to center line) from south to north, the average width per segment, and the approximate dredging volume per channel segment and the approximate total. Also included is the area of the large basin.

Channel Length (ft)	Approximate Average Width (ft)	Dredging Depth (ft)	Approximate Volume (cy)
1,000	50	17	31,500
1,100	150	17	69,300
700	100	17	44,100
2,000	100	17	125,900
1,300	100	17	81,900
500	100	17	31,500
Large Basin (sf)	862,000	17	542,700
<b>TOTALS</b>	<b>6,600</b>	<b>---</b>	<b>926,900</b>

The channels would be excavated from the land and in the dry, then filled with water after fully constructed. Because of the expected long hauling distance and because of the possible saltwater content in the soils, the cost per cubic yard of excavated material may be on the order of \$12/cy.

**The total dredging cost is approximately \$11.2 million.**

#### Construct Seawall

Because of the limited area, a vertical seawall is assumed for the project. A revetted slope would require much more width than is available or assumed at this time (a slope of 3 to 1 would require 150 feet for a bottom channel width of 50 feet (17-ft depth x 3:1 slope x 2 sides = 100 ft + 50 ft chl width = 150 ft). The vertical seawall will be much more expensive to construct, but will utilize the space much better. Approximately 13,500 feet of seawall would be required in the main channel and approximately 6,000 ft would be required for the large basin. The total

seawall length required for this revised alternative is approximately 19,500 linear feet. The vertical seawall may cost on the order of \$2,500 per linear foot of wall.

**The total seawall cost is approximately \$49 million.**

### **Maintenance Dredging in Proposed Channels**

It is assumed that minor dredging may need to occur near the connection to San Diego Bay from a build-up of sediments. It is assumed that 20% of the initial approach channel may fill in each year (as a maximum volume). This is estimated as 20% of 31,500 cy, or 6,300 cy. The upland disposal cost of this sediment is probably about \$20 per cubic yard because of the salt water content of the material. If the material could be disposed of offshore or nearshore (suitable sandy material), then the costs could be less.

For these assumptions the maintenance dredging costs would be approximately \$126,000 each year, or \$6.3 million over a 50-year design life.

### **Water Circulation (Pumps)**

Pumps may or may not be required for the complete Bay-to-Bay channel. Without modelling, this is difficult to answer. In order to assume the worse case, we should assume that several (5-10) pumps may be needed to provide adequate circulation and water quality. The approximate cost of the pumps is approximately \$75,000 each. Also, there should be an annual maintenance cost factored in at approximately \$30,000 each year (\$1.5 million for the 50-year project life).

The cost for water circulation is approximately \$750,000 for 10 pumps and \$1.5 million over 50 years for maintenance.

### **Wet Utilities**

Some existing utilities will need to be replaced in order to attain the proposed alternative configuration. These include sewer mains, storm drains, and water mains. With rerouting of the sewer line, new lift stations may be needed. It is estimated that approximately 3,800 linear feet of 96-inch sewer main will need to be demolished and replaced with 4,400 linear feet in order to reroute around the navigable channel. The attached table outlines each utility demolition and construction. The total approximate cost for utility demolition and reconstruction is approximately \$18 million. Alternative 1A (below) has a slightly higher cost (\$19.3 million), because of additional storm drain relocation along the north segment, adjacent to the SD River levee. This cost does not include any increase in the existing City Treatment Facilities or construction of new treatment facilities. The increase in residential usage may warrant a need for such increase or new facility.

## **ALTERNATIVE 1A – SEPARATE BREAKDOWN FOR LINK TO MISSION BAY**

### **Dredge through Levee**

The last segment of channel that would extend from the northern-most channel, through the levee to the San Diego River would require approximately 54,000 cy of excavation (100 ft wide

x 700 ft long x 21 ft average depth). It is assumed that the ground elevation is approximately +10 feet MLLW and approximately +18 feet MLLW at the levee. The cost per cubic yard is estimated at \$15 per cubic yard. Costs are higher because of logistics of removing from channel (i.e., ramps and traffic, etc.). This northernmost leg from the large basin towards the levee would also require about 1300 lf of seawall.

The cost of the final channel leg would be approximately \$810,000 plus approximately \$100,000 for Mobilization costs.

### **Maintenance Dredging in North Channel.**

This alternative includes the direct link through the San Diego River to Mission Bay, therefore maintenance dredging would also need to be conducted along the northern reach. It is assumed that approximately 40,000 cy may need to be dredged each year.

The maintenance dredging costs would be approximately \$800,000 each year, or \$40 million over a 50-year design life.

### **Construct Flood Gate at San Diego River**

The flood gate is assumed to be a moveable gate that slides along a track separating the San Diego River and the new channels. The gate would probably be a steel gate with a support and driving mechanism. The dimensions would be about 75 feet long and 26 feet high (from +18 to -8 ft MLLW).

The approximate cost for the gate is approximately \$1,000,000 and would also require approximately \$500,000 in levee adjustments for gate construction.

### **Dredge in San Diego River**

It is assumed that the average elevation within the San Diego River area to be dredged is about +5 feet MLLW (0 near mouth and maybe around +10 near flood gate area). The length of the channel would be approximately 10,000 feet long by 75 feet wide and the depth would be to -10 feet MLLW to allow for some deposition without the need for constant maintenance. The total approximate volume is 425,000 cy. The upland disposal cost of this sediment is probably about \$20 per cubic yard because of the salt water content of the material. If the material could be disposed of offshore or nearshore (suitable sandy material), then the costs could be less.

The approximate initial dredging cost is \$8.5 million.

It is assumed that the channel would need to be maintained to an adequate depth and would fill in rather quickly. It is assumed that average maintenance of 30% of the initial dredging volume would be needed on an annual basis. Some years it may be less and others it may be more frequent. It is therefore assumed that 130,000 cy would need to be dredged annually and the disposal cost is \$20 per cubic yard.

The approximate maintenance cost is \$2.6 million per year, or \$130 million over a 50-year design life.

### **Construct Gate at Mission Bay**

A gate would need to be constructed through the center jetty between the San Diego River and Mission Bay. Currently, there is a weir that exists to control storm flows from the river. The proposed gate would be similar to the levee gate, but not necessarily as large or complex.

It is estimated that the cost for this gate is around \$750,000.

## **ALTERNATIVE 2 – INTERNAL WATERWAY AND PARK SYSTEM**

### **Dredge Channel**

Assumptions: (1) Average ground elevation is +10 ft MLLW. (2) Since an internal waterway is not subject to tidal influences, the channel depth is estimated at 6 feet, plus 2 feet of freeboard for flood control. Therefore, the channel bottom depth is at +2 feet MLLW. (3) There are two water loops proposed, the Western Loop and the Eastern Loop. The channels would be excavated from the land and in the dry, then filled with water after fully constructed. Because of the expected long hauling distance, the cost per cubic yard of excavated material may be on the order of \$12/cy

Western Loop. The length is approximately 2,700 feet long with widths varying from 50 feet to 200 feet. The average width is approximately 90 feet wide. Therefore, the total volume of material to be dredged for the Western Loop is approximately 72,000 cy.

Eastern Loop. The length is approximately 4,800 feet long with a constant width of 50 feet. Therefore, the total volume of material to be dredged for the Eastern Loop is approximately 71,000 cy.

**The total dredging cost is approximately \$1.7 million.**

### **Construct Seawall**

Because of the limited area, a vertical seawall is assumed for the project. A revetted slope would require much more width than is available or assumed at this time. The vertical seawall will be more expensive to construct, but will utilize the space much better. The vertical seawall may cost on the order of \$1,500 per linear foot of wall. It is less expensive for this alternative compared to Alternative 1 because the height will be much less. The total length of seawall required for this alternative is approximately 16,000 linear feet (i.e., a wall on both sides of the channel).

**The total seawall cost is approximately \$24.0 million.**

### **Maintenance Dredging in Proposed Channels**

Minimal maintenance dredging is expected for this alternative, since there would not be any natural deposition sources.

### **Water Circulation (Pumps)**

Pumps will probably be needed for the internal waterway park system. It is assumed that 4 pumps may be needed to provide adequate circulation and water quality (two in each loop). The approximate cost of the pumps is approximately \$75,000 each. Also, there should be an annual maintenance cost factored in at approximately \$10,000 each year (\$500,000 for the 50-year project life).

The cost for water circulation is approximately \$300,000 for 4 pumps and \$0.5 million over 50 years for maintenance.

### **Relocate Wet Utilities**

This alternative also includes demolition and relocation of sewer and storm systems. The 96-inch sewer main will not need to be relocated for this revised alternative. Only minor segments of the larger storm drain network may need to be relocated. The total approximate cost for utility demolition and reconstruction is approximately \$3.7 million, which includes a new storm drain network will be needed at an estimated cost of \$2.5 million. This cost does not include any increase in the existing City Treatment Facilities or construction of new treatment facilities. The increase in residential usage may warrant a need for such increase or new facility.

### **ALTERNATIVE 3 – OPEN PARK SPACE (NO WATER ALTERNATIVE)**

There is no water way proposed for this alternative. Therefore, there are no costs for excavation of seawall construction. The only costs that we will consider is the relocation of utilities.

### **Wet Utilities**

This alternative will not need to alter the existing 96-inch sewer main. However, a new storm drain network will be needed at an estimated cost of \$2.5 million.

		ORDER OF MAGNITUDE ESTIMATE				JOB. NO. 4986	
		PROJECT: Bay to Bay Link Feasibility Study				SHEET 1 OF 2	
		EST. FOR: Utility Relocation				EST. BY: ER	
EFF. DATE		TYPE EST. PRELIMINARY REVISED		FINAL		CKD BY: AL	
						DATE: 1/31/2003	
ALTERNATIVE 3 - PARK SYSTEM LINKAGE							
ITEM NO.	ITEM			QUANTITY	UNIT	UNIT COST	TOTAL
FIRST COSTS							
A	UTILITY CONSTRUCTION						
1	Construct Storm Drain Network (Local Streets)			1	LS	\$2,500,000	\$2,500,000
	Sub Total						\$2,500,000
	TOTAL						\$2,500,000
	20% Contingency						\$500,000
	GRAND TOTAL. FIRST COST						\$3,000,000

## **IX. DRY UTILITIES**

Existing dry utility systems will be impacted by all three design alternatives. San Diego Gas & Electric, Pacific Telephone (SBC), and Cox Communications have existing overhead and underground utility systems located within the projects study areas that would have to be removed, relocated, overhead systems placed underground, and new utility service constructed to new and existing structures. The basis for the construction cost estimates, that are presented, in this feasibility report, are standard local utility company system engineering, design, construction standards, and actual utility company unit construction costs. The utility's unit cost are comprised of labor, material, and overhead cost components.

### **Assumptions:**

Due to the significant size of the study areas, detailed itemized cost estimates would be impractical. As a result, system models were developed which represent various system types that currently exist in the project areas. The two main dry utility system categories used in this report are:

- **Distribution Systems** – Distribution systems are systems that would normally be used by utility companies to transport and provide service to customers in a given area.
- **Transmission / Trunk Systems** – Transmission (gas and electric) and trunk systems (telecommunication) are those systems that are required by utilities to transport substantial system capacities and / or are required when distance is a factor for transporting the utility's required capacity to an area.

The models used in representing the two system types contain cost for removing, relocating, Undergrounding, and extending new service to existing and new structures. All cost estimates include the following cost components:

Trench • Substructure Excavation • Substructures • Padmount Equipment  
Conduits • Cable • Wire • Splices • Fiber Optics • Street Repair • Cable Poles

### **Cost Estimate Methodology:**

The method used in determining a per-foot cost for each utility model is based on all system requirements that would be required for a system of 1100 feet in length. The actual system design is for a representative system of 550 feet. The dimension of 550 feet is used in order to eliminate doubling the cost of the number of major substructures that would normally be specified if we were to use 1100 feet from substructure to substructure. The following is a listing of the per foot cost projections for the two system types:

#### **• DISTRIBUTION SYSTEMS**

<b>System Type</b>	<b>Cost Estimate</b>	<b>System Footage</b>	<b>System Footage Estimate</b>
Telephone	\$ 564,557.29	550	\$ 1,026.47
Cable Television (CATV)	121,196.17	550	220.36
Gas	138,285.77	550	251.43
Electric	536,255.63	550	975.01
Fiber Optics (included in CATV cost)	0.00	550	0.00

- **TRANSMISSION SYSTEMS**

<b>System Type</b>	<b>Cost Estimate</b>	<b>System Footage</b>	<b>System Footage Estimate</b>
Telephone	645,134.45	550	\$ 1,172.97
Cable Television (CATV)	164,680.11	550	299.42
Gas	99,469.66	550	180.85
Electric	1,035,490.35	550	1,882.71
Fiber Optics (included in CATV cost)	0.00	550	0.00

**Dry Utility System Cost Estimate Summary:**

The following cost estimates represent potential dry utility system cost that should be taken into consideration in obtaining a complete perspective of all applicable project cost. The dry utility system costs were prepared based on a worst-case scenario and should not be construed as the project's actual dry utility financial liability.

The dry utility system cost estimates include all work dry utility companies would be normally require in order to complete the removal, relocation and undergrounding of existing overhead and underground facilities. The Bay to Bay Project will cause all dry utility companies that have facilities in the area to have to modify their existing systems in order to accommodate planned improvements that will displace the utility's facilities. As a result, local utility companies will request full compensation for any work that they must perform to accommodate the proposed improvements.

Strategic Dry Utility Action Plan – Assuming the proposed project's budget cannot afford paying local utility companies the fees indicated in the report, the project must develop a strategy which will result in significant reductions in the projects dry utility cost obligation. The Strategic Dry Utility Action Plan, if developed and successfully implemented by a qualified dry utility consulting engineer, will force local utility companies to substantially reduce the project's dry utility financial obligation.

Most often a Strategic Dry Utility Action Plan, for public sector projects will include the following: 1). Utility system design control to achieve favorable utility service rule application, 2). Input on information that will be shown on the project consultant teams plans, 3). Public agency enforcement of utility franchise agreements, 4). Utility's adherence to state and federal case law.

In our professional opinion, the project's financial obligation can be reduced by eighty to ninety percent depending on the successful implementation of a Strategic Dry Utility Action Plan and the number and types of easements utilities may have for their existing facilities.

The following dry utility system cost estimates are representative of the cost dry utility companies would project as their cost to remedying impacts to their systems as a result of improvements proposed by the Bay to Bay Project:

**ALTERNATIVE 1 – NAVIGABLE CHANNEL**

**PARKS**

<b>System</b>	<b>Distribution Systems</b>	<b>Transmission Systems</b>	<b>Subtotal</b>
Telephone	\$ 4,133,596	\$ 3,148,251	\$ 7,281,847
Cable Television (CATV)	594,531	538,657	1,133,188
Gas	2,339,304	476,178	2,815,482
Electric	11,583,119	293,703	11,876,822
Fiber Optics (included in CATV cost)	N/A	N/A	N/A
	<u>\$ 18,650,550</u>	<u>\$ 4,456,789</u>	<u>\$ 23,107,339</u>

**WATERWAYS**

<b>System</b>	<b>Distribution Systems</b>	<b>Transmission Systems</b>	<b>Subtotal</b>
Telephone	\$ 1,129,117	\$ 860,960	\$ 1,990,077
Cable Television (CATV)	290,655	263,490	554,145
Gas	402,288	46,297	448,585
Electric	5,440,556	201,450	5,642,006
Fiber Optics (included in CATV cost)	N/A	N/A	N/A
	<u>\$ 7,262,616</u>	<u>\$ 1,372,197</u>	<u>\$ 8,634,813</u>

**ALTERNATIVE 1 – NAVIGABLE CHANNEL TOTAL DRY UTILITY COST ESTIMATE** **\$ 31,742,152**

**ALTERNATIVE 2 – NON - TIDAL CHANNEL**

**PARKS**

<b>System</b>	<b>Distribution Systems</b>	<b>Transmission Systems</b>	<b>Subtotal</b>
Telephone	\$ 15,481,221	\$ 11,795,386	\$ 27,276,607
Cable Television (CATV)	611,279	738,669	1,349,948
Gas	5,578,729	0	5,578,729
Electric	38,030,265	0	38,030,265
Fiber Optics (included in CATV cost)	N/A	N/A	N/A
	<u>\$ 59,701,494</u>	<u>\$ 12,534,055</u>	<u>\$ 72,235,549</u>

**WATERWAYS**

<b>System</b>	<b>Distribution Systems</b>	<b>Transmission Systems</b>	<b>Subtotal</b>
Telephone	\$ 857,102	\$ 654,517	\$ 1,511,619
Cable Television (CATV)	815,112	738,669	1,553,811
Gas	1,103,023	0	1,103,023
Electric	8,135,844	0	8,135,844
Fiber Optics (included in CATV cost)	N/A	N/A	N/A
	<u>\$ 10,911,081</u>	<u>\$ 1,393,186</u>	<u>\$ 12,304,297</u>

**ALTERNATIVE 2 – NON-TIDAL CHANNEL TOTAL DRY UTILITY COST ESTIMATE** **\$ 84,539,816**

**ALTERNATIVE 3 – PARK SYSTEM LINKAGE****PARKS**

<b>System</b>	<b>Distribution Systems</b>	<b>Transmission Systems</b>	<b>Subtotal</b>
Telephone	\$ 11,973,773	\$ 9,122,188	\$ 21,095,961
Cable Television (CATV)	1,736,684	1,504,586	3,241,270
Gas	4,127,223	4,501,176	8,628,399
Electric	67,564,293	7,344,452	74,908,745
Fiber Optics (included in CATV cost)	N/A	N/A	N/A
	<u>\$ 85,401,973</u>	<u>\$ 22,472,402</u>	<u>\$107,874,375</u>

**WATERWAYS**

<b>System</b>	<b>Distribution Systems</b>	<b>Transmission Systems</b>	<b>Subtotal</b>
Telephone	\$ 0	\$ 0	\$ 0
Cable Television (CATV)	0	0	0
Gas	0	0	0
Electric	0	0	0
Fiber Optics (included in CATV cost)	N/A	N/A	N/A
	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>

**ALTERNATIVE 3 – PARK SYSTEM LINKAGE DRY UTILITY COST ESTIMATE****\$107,874.375**

## **IX. TRANSPORTATION**

### **CIRCULATION**

This section includes several circulation-related issues. In addition to the obvious vehicular circulation concerns including street cross sections and intersections, the subjects of pedestrian and bicycle circulation and transit circulation are addressed.

Our approach made extensive use of previous studies that have been conducted in the area, and the plan is focused on continuing the existing grid system within the Midway Pacific Highway Corridor planning area. We recognize that the study area is influenced by circulation patterns that are not within the Master Planning Area. An example is the heavy traffic movement between the airport and Interstate 8.

#### **Characterization**

The Midway Pacific Highway Planning Area characterized by its system of wide streets, heavy traffic flows and non-standard intersection configurations. The area is bounded by two major freeways: Interstate 5 to the east and Interstate 8 to the north. State Route 209 bisects the central commercial core of the community and numerous one-way streets add to the complexity of circulation in the area.

#### **Vehicular Circulation**

Roadway segments in the area operate for the most part under their optimal capacities – the exceptions are Sports Arena Boulevard between I-8 and Midway Drive and Rosecrans/Camino Del Rio West between Midway and I-8/I-5 interchange. These segments and adjacent intersections are highly congested during peak hours.

The most significant observations in terms of existing circulation conditions are:

- ▲ Sports Arena Boulevard, Pacific Highway, Midway Drive, Barnett Avenue and Rosecrans Street (between Pacific Highway and Kurtz Street) have and are expected to continue to have excess capacity to accommodate additional traffic from redevelopment/redirection from the Bay-to-Bay Link.
- ▲ Incomplete freeway ramps cause non-local through traffic congestion. Non-standard interchanges limit access to/from the area.
- ▲ Multiple curb cuts for commercial properties along Rosecrans reduce capacity and add to congestion.
- ▲ Many commercial properties have garages that open directly onto streets and limit on-street parking opportunities (Hancock Street, Kurtz Street).
- ▲ Confusing street patterns create longer than necessary trip lengths. Streets intersect at acute angles constraining traffic flows and contributing to congestion.

- ▲ The Midway/Pacific Corridor Community Plan calls for grade separation of the Rosecrans/Sports Arena intersection via flyover or tunnel to accommodate future traffic.
- ▲ Currently all of the intersections in the area operate at LOS D or better during peak hours.

## **PEDESTRIAN AND BICYCLE CIRCULATION**

Special pedestrian amenities are limited in the area. They either consist of the normal sidewalks along the streets, and some of these are in deteriorated condition or do not meet current standards.

### **Bikeways**

Few bicycle facilities are provided in the study area. These facilities include:

- Class II (Bike Lane)  
In this case, a lane is painted for one-way travel on the pavement for exclusive use by bicycles, with crossings by pedestrians and motorists permitted.
- Class III (Bike Route)  
This type of bikeway is designated solely by signs or other such markings and is shared with motorists and pedestrians.

A Class II Bike Lane is provided along Pacific Highway linking Seaworld Drive to downtown San Diego. A Class III Bike Route is designated on Sports Arena Boulevard between I-8 and Midway Drive.

## **TRANSIT CIRCULATION**

The Midway/Pacific Corridor has several transit options including bus service, trolley and heavy rail all of which can be used to get to almost any major destination within the City of San Diego. The Old Town Transit Center offers convenient access to the San Diego Trolley, the Coaster and ten bus routes.

The bus service offers both local routes and express routes with stops throughout the area. The streets with the highest amount of bus service are Rosecrans and Pacific Highway. The Metropolitan Transit Development Board (MTDB) provides the bus service.

The San Diego Trolley stops at the Old Town Transit Center and provides access to downtown as well as Mission Valley. The Metropolitan Transit Development Board (MTDB) provides the trolley service.

The Old Town Transit Center also provides access to the Coaster, operated by North County Transit District (NCTD), which provides commuter rail service to seven stations along the San Diego coastline.

**Bay to Bay Link Feasibility Study**

<b>Park System Linkage Concept Alternative</b>	<b>\$ 32,021,758</b>
<b>Non Tidal Channel Concept Alternative</b>	<b>\$ 42,980,379</b>
<b>Navigable Channel San Diego Bay to Mission Bay Concept Alternative</b>	<b>\$ 55,935,913</b>

<b>Park System Linkage Concept Alternative</b>				
<i>Item</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Quantity</i>	<i>Cost</i>
Roadway Cross Section 4 Lane Collector W/O Median	LF	\$887.77	12,200	\$10,830,845
Roadway Cross Section 4 Lane Major W/ Median	LF	\$926.81	400	\$370,724
Roadway Cross Section 6 Lane Major W/ Median	LF	\$1,034.55	2,200	\$2,276,008
Roadway Cross Section 6 Lane Major (One Way)	LF	\$821.03	7,600	\$6,239,829
Traffic Signal W/ Lighting at Intersection Only	Each	\$120,000	25	\$3,000,000
Bridge Structure	SF	\$250	0	\$0
Structural Fill	CY	\$10	0	\$0
Roadway Removal	LF	\$200	14,500	\$2,900,000
Support Cost	%	25%	1	\$6,404,352
<i>Sub-Total</i>				\$32,021,758
Business Relocation		0%	1	\$0
Right-of-Way	SF	\$0	706,500	\$0
<b>Grand Total</b>				<b>\$32,021,758</b>

Non Tidal Channel Concept Alternative				
<i>Item</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Quantity</i>	<i>Cost</i>
Roadway Cross Section 4 Lane Collector W/O Median	LF	\$887.77	10,000	\$8,877,742
Roadway Cross Section 4 Lane Major W/ Median	LF	\$926.81	400	\$370,724
Roadway Cross Section 6 Lane Major W/ Median	LF	\$1,034.55	2,200	\$2,276,008
Roadway Cross Section 6 Lane Major (One Way)	LF	\$821.03	7,600	\$6,239,829
Traffic Signal W/ Lighting at Intersection Only	Each	\$120,000	20	\$2,400,000
Bridge Structure	SF	\$250	42,000	\$10,500,000
Structural Fill	CY	\$10	56,000	\$560,000
Roadway Removal	LF	\$200	15,800	\$3,160,000
Support Cost	%	25%	1	\$8,596,076
<i>Sub-Total</i>				\$42,980,379
Business Relocation		0%	1	\$0
Right-of-Way	SF	\$0	391,500	\$0
<b>Grand Total</b>				<b>\$42,980,379</b>

<b>Navigable Channel San Diego Bay to Mission Bay Concept Alternative</b>				
<i>Item</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Quantity</i>	<i>Cost</i>
Roadway Cross Section 4 Lane Collector W/O Median	LF	\$887.77	8,200	\$7,279,748
Roadway Cross Section 4 Lane Major W/ Median	LF	\$926.81	400	\$370,724
Roadway Cross Section 6 Lane Major W/ Median	LF	\$1,034.55	4,400	\$4,552,016
Roadway Cross Section 6 Lane Major (One Way)	LF	\$821.03	8,000	\$6,568,241
Traffic Signal W/ Lighting at Intersection Only	Each	\$120,000	24	\$2,880,000
Bridge Structure	SF	\$250	80,200	\$20,050,000
Structural Fill	CY	\$10	44,800	\$448,000
Roadway Removal	LF	\$200	13,000	\$2,600,000
Support Cost	%	25%	1	\$11,187,183
<i>Sub-Total</i>				\$55,935,913
Business Relocation		0%	0	\$0
Right-of-Way	SF	\$0	657,000	\$0
<b>Grand Total</b>				<b>\$55,935,913</b>

<b>4 Lane Collector W/O Median Cross Section</b>					
Item	Unit	Unit Price	Section	Cost/LF	Notes
Clearing & Grubbing	SF	\$0.50	84	\$42.00	
Grading	SF	\$1.00	84	\$84.00	
Storm Drain Pipe 36"	LF	\$145.00	1	\$145.00	
Storm Drain MH	Each	\$4,000.00	0.003333333	\$13.33	1.
Curb Inlet	Each	\$3,850.00	0.005	\$19.25	2.
Sewer Main	LF	\$100.00	1	\$100.00	
Sewer MH	Each	\$3,250.00	0.003333333	\$10.83	1.
Water Main	LF	\$1.00	100	\$100.00	
Other Utilities Relocation	LF	\$100.00	1	\$100.00	
Curb & Gutter	LF	\$14.50	2	\$29.00	
PCC Sidewalk 4"	SF	\$4.00	10	\$40.00	
AC Pavement 4"	SF	\$1.75	60	\$105.00	
Agg. Base	SF	\$0.90	65	\$58.50	
Signing & Striping	LF	\$1.00	15	\$15.00	3.
Sub-Total				\$861.92	
Traffic Control	%	3.00%		\$25.86	
Total Per LF	LF		1	<b>\$887.77</b>	

<b>4 Lane Major W/ Median Cross Section</b>					
Item	Unit	Unit Price	Section	Cost/LF	Notes
Clearing & Grubbing	SF	\$0.50	98	\$49.00	
Grading	SF	\$1.00	98	\$98.00	
Storm Drain Pipe 36"	LF	\$145.00	1	\$145.00	
Storm Drain MH	Each	\$4,000.00	0.003333333	\$13.33	1.
Curb Inlet	Each	\$3,850.00	0.005	\$19.25	2.
Sewer Main	LF	\$100.00	1	\$100.00	
Sewer MH	Each	\$3,250.00	0.003333333	\$10.83	1.
Water Main	LF	\$1.00	100	\$100.00	
Other Utilities Relocation	LF	\$100.00	1	\$100.00	
Curb & Gutter	LF	\$14.50	2	\$29.00	
Curb	LF	\$8.00	2	\$16.00	
PCC Sidewalk 4"	SF	\$4.00	10	\$40.00	
AC Pavement 4"	SF	\$1.75	60	\$105.00	
Agg. Base	SF	\$0.90	66	\$59.40	3.
Signing & Striping	LF	\$1.00	15	\$15.00	
Sub-Total				\$899.82	
Traffic Control	%	3.00%		\$26.99	
Total Per LF	LF		1	<b>\$926.81</b>	

1. MH per 300 ft of Roadway
2. Inlet per 200 ft of Roadway
3. \$0.40/LF Strip + \$ for Signage

<b>6 Lane Major W/ Median Cross Section</b>					
Item	Unit	Unit Price	Section	Cost/LF	Notes
Clearing & Grubbing	SF	\$0.50	122	\$61.00	
Grading	SF	\$1.00	122	\$122.00	
Storm Drain Pipe 36"	LF	\$145.00	1	\$145.00	
Storm Drain MH	Each	\$4,000.00	0.003333333	\$13.33	1.
Curb Inlet	Each	\$3,850.00	0.005	\$19.25	2.
Sewer Main	LF	\$100.00	1	\$100.00	
Sewer MH	Each	\$3,250.00	0.003333333	\$10.83	1.
Water Main	LF	\$1.00	100	\$100.00	
Other Utilities Relocation	LF	\$100.00	1	\$100.00	
Curb & Gutter	LF	\$14.50	2	\$29.00	
Curb	LF	\$8.00	2	\$16.00	
PCC Sidewalk 4"	SF	\$4.00	10	\$40.00	
AC Pavement 4"	SF	\$1.75	84	\$147.00	
Agg. Base	SF	\$0.90	90	\$81.00	3.
Signing & Striping	LF	\$1.00	20	\$20.00	
Sub-Total				\$1,004.42	
Traffic Control	%	3.00%		\$30.13	
Total Per LF	LF		1	<b>\$1,034.55</b>	

<b>6 Lane Major (One Way Only) Cross Section</b>					
Item	Unit	Unit Price	Section	Cost/LF	Notes
Clearing & Grubbing	SF	\$0.50	62	\$31.00	
Grading	SF	\$1.00	62	\$62.00	
Storm Drain Pipe 36"	LF	\$145.00	1	\$145.00	
Storm Drain MH	Each	\$4,000.00	0.003333333	\$13.33	1.
Curb Inlet	Each	\$3,850.00	0.005	\$19.25	2.
Sewer Main	LF	\$100.00	1	\$100.00	
Sewer MH	Each	\$3,250.00	0.003333333	\$10.83	1.
Water Main	LF	\$1.00	100	\$100.00	
Other Utilities Relocation	LF	\$100.00	1	\$100.00	
Curb & Gutter	LF	\$14.50	2	\$29.00	
PCC Sidewalk 4"	SF	\$4.00	10	\$40.00	
AC Pavement 4"	SF	\$1.75	48	\$84.00	
Agg. Base	SF	\$0.90	53	\$47.70	
Signing & Striping	LF	\$1.00	15	\$15.00	3.
Sub-Total				\$797.12	
Traffic Control	%	3.00%		\$23.91	
Total Per LF	LF		1	<b>\$821.03</b>	

- 1. MH per 300 ft of Roadway
- 2. Inlet per 200 ft of Roadway
- 3. \$0.40/LF Strip + \$ for Signage

## **X. LIMITED GEOTECHNICAL EVALUATION**

### **INTRODUCTION**

In accordance with your request, Ninyo & Moore has performed a limited geotechnical evaluation of the subject study area (Figure 1 – not provided). The purpose of this study was to evaluate geologic and geotechnical conditions using available geologic and geotechnical data and to provide a geotechnical reconnaissance report, which we understand will be utilized in the preparation of environmental impact documents. This report presents our preliminary findings and conclusions pertaining to the proposed Bay-to-Bay Link Feasibility Study. Subsurface exploration and laboratory testing of materials were not included in the scope of this limited evaluation. This study is intended to give a broad overview of the geotechnical conditions in the project area. Conclusions and recommendations regarding the design of specific improvements will necessitate further evaluations.

### **SCOPE OF SERVICES**

Ninyo & Moore's scope of services has included review of background materials and a geologic reconnaissance of the study area. Specifically, we have performed the following tasks:

- Review of pertinent, available geotechnical literature including geologic and geotechnical maps, stereoscopic aerial photographs, and geotechnical and geologic reports. Documents pertaining to our evaluation of the study area are listed in the Selected References section of this report.
- Performance of a geologic reconnaissance of the project study area by a California Registered Geologist, which included written and photographic documentation of the observed site conditions. These materials are on file at the offices of Ninyo & Moore and are available for review upon request. A geologic map is provided as Figure 2.
- Compilation and analysis of data obtained, with particular emphasis on potential geologic and geotechnical hazards such as soft ground conditions, shallow groundwater, expansive soils, unstable slopes, landslides, faulting and seismicity, and liquefaction. A geotechnical hazards map is provided as Figure 3.
- Preparation of this report presenting our preliminary findings, conclusions, and pre-design geotechnical recommendations pertinent to the development of the project area. This report specifically addresses the potential seismic and fault hazards, liquefaction potential, landslide potential, slope stability, other potential geotechnical constraints, and potential mitigation measures.

### **PROJECT AREA DESCRIPTION**

The study area is located generally north of San Diego Bay and Lindbergh Field, south of the San Diego River, west of Interstate 5, southeast of Point Loma Boulevard, and northwest of Rosecrans Boulevard in San Diego, California (Figure 1 – not provided). Specifically, this area, a portion of the Midway/Pacific Highway Corridor, includes the communities of Midway, Loma Portal, and Old Town, as well as a portion of the Naval Training Center. The location of the study

area is presented in Figure 1. For the purposes of this study, the area has been divided into four quadrants, A through D. Quadrant A is composed of the San Diego River Floodway between Mission Bay Channel, on the west, and Linda Vista Road, on the east. Quadrant B is located between West Mission Bay Drive, Sports Area Boulevard, the south bank of the San Diego River Floodway, Rosecrans Street, and Taylor Street, in Old Town. Quadrant C is located between Sports Arena Boulevard, Rosecrans Street, Groton Street, Shadowlawn Street, and Meadow Grove Drive. Quadrant D encompasses the area between Rosecrans Street, Lytton Street, San Diego Bay, Barnett Avenue, Pacific Highway, and Interstate 5.

The topography of a large portion of the site is generally level with elevations ranging between sea level and 10 to 15 feet over the majority of the site. Elevations range up to approximately 150 feet above sea level in the vicinity of Midway High School and Cabrillo Hospital, where there are mostly northeast-facing, relatively steep slopes. Steep slopes are also present in the Presidio Park area of Old Town.

## **PROJECT DESCRIPTION**

It is our understanding that the project includes the proposed redevelopment of the project area and the construction of a navigable channel from San Diego Bay to Mission Bay. The proposed redevelopment incorporates the commercial revitalization of the area and the development of residential, institutional, industrial, multiple use, and public open space land use. The proposed navigable channel is planned to extend from the northern tip of the existing boat channel in San Diego Bay, on the Naval Training Center property, through the Midway area, and connect to the San Diego River Floodway east of West Mission Bay Drive. The waterway will extend to the west along the San Diego River Floodway, connecting with the Mission Bay Channel and the open sea. The waterway will presumably undercross Barnett Avenue, Rosecrans Street, Midway Drive, Point Loma Boulevard, and Interstate 8 by means of a series of bridges. The waterway will likely be created by dredging through the Midway area and along the San Diego River Floodway.

## **GEOLOGY**

The following sections present our findings relative to regional geology, site geology, groundwater, faulting and seismicity, liquefaction, landslides and slope stability, and other potential geologic hazards and constraints to development.

### **Regional Geologic Setting**

The project study area is situated in the western portion of the Peninsular Ranges geomorphic province of southern California. This geomorphic province encompasses an area that extends 125 miles from the Transverse Ranges and the Los Angeles Basin, south to the Mexican border, and beyond another 775 miles to the tip of Baja California (Norris and Webb, 1990). The geomorphic province varies in width from 30 to 100 miles, most of which is characterized by northwest trending mountain ranges separated by subparallel fault zones. In general, the Peninsular Ranges are underlain by Jurassic-age metavolcanic and metasedimentary rocks and by Cretaceous-age igneous rocks of the southern California batholith. The westernmost portion of the province in San Diego County generally consists of Upper Cretaceous-, Tertiary-, and Quaternary-age sedimentary rocks.

The Peninsular Ranges are traversed by several major active faults. The Whittier-Elsinore, San Jacinto, and the San Andreas faults are major active fault systems located northeast of

the site and the Agua Blanca-Coronado Bank and San Clemente faults are active faults located to the west-southwest. The Rose Canyon fault zone is also a major active fault system, located in the San Diego area, portions of which have been included in State of California Earthquake Fault Zones. Major tectonic activity associated with these and other faults within this regional tectonic framework is right-lateral strike-slip movement. These faults, as well as other faults in the region, have the potential for generating strong ground motions at the project site. Further discussion of faulting relative to the study area is provided in the Faulting and Seismicity section of this report. The locations of major faults in the area are presented in Figure 4 (not provided).

### **Study Area Geology**

Based on our literature review, including published geologic maps and available geotechnical reports, the study area is underlain generally by artificial fill, alluvium and slope wash, bay deposits, terrace deposits (Bay Point Formation), and materials of the Mount Soledad Formation. A description of these units, as described in the cited literature, and based on our site reconnaissance is presented below. A map depicting the areal extent of the above-named units is presented on Figure 2. The Geologic Map is based on our site reconnaissance, our stereoscopic photograph review, previous geotechnical evaluations, and referenced published data.

#### **Artificial Fill (Map Symbol Qaf)**

We anticipate that portions of the study area are underlain by artificial fill placed during the grading of the developments, and hydraulic fill placed during land reclamation construction projects. Fill is especially prevalent along the south bank of the San Diego River channel, the Midway and Sports Arena areas, the Loma Square and Naval Training Center areas, and the low-lying areas of Old Town. Due to widespread nature of the fill material, we have included fill material as a separate unit. The majority of the hydraulic fill material was derived from the dredging of the Mission Bay and San Diego Bay areas.

In general, fill material is expected to be on the order of 5 to 10 feet deep with locally deeper areas. Fill material is generally light brown to grayish brown, loose to medium dense, sand with varying amounts of gravel, silt, and clay. Riprap is also present along the San Diego River Flood Control Channel for erosion control.

Fill materials encountered at specific sites should be evaluated on a case-by-case basis to evaluate the condition of existing fill, if it is planned for support of structural improvements. Fill material may require removal and recompaction to be suitable for the support of structures or compacted fill. Fill material will likely provide relatively easy excavation along the canal alignment. However, granular fill material below the groundwater level may be subject to liquefaction and seismically induced settlement during an earthquake.

Two large previous municipal landfills exist in the study area. One of the landfills is located in the vicinity of the Sports Arena between Midway Drive, Sports Arena Boulevard, and Point Loma Boulevard in Quadrant B. The other, the Mission Bay

Landfill, is located along the north bank of the San Diego River flood control channel along Sea World Drive between West Mission Bay Drive and Interstate 5. These landfills are known to contain trash and burn material. Developments proposed in the landfill areas should be evaluated due to the high potential for future settlement.

#### **Alluvium and Slope Wash (Map Symbol Qal)**

Holocene alluvial deposits are mapped in several drainage courses at the project site and along the channel of the San Diego River. Localized deposits of alluvium may also be present beneath the fill in some portions of the project. Areas of relatively thick alluvium are located in the drainage courses, generally consisting of uncemented sandy clay, silty sand, and clayey sand with varying amounts of cobbles and gravel. Slope wash is generally present along the flanks and base of slopes. These units have not been differentiated on the geologic map. Alluvial deposits composed of granular material below the groundwater level may be susceptible to liquefaction and seismically induced settlement. Alluvial material at ground surface may need to be removed and recompacted in areas to receive structures or compacted fill.

#### **Bay Deposits (Not Mapped)**

Holocene-age bay and estuary deposits are locally present at the site. Previous evaluations have indicated that bay deposits underlie the fill in the Midway area, the Naval training Center area, and in the Mission Bay Channel and San Diego Bay. In general, the bay deposits consist of dark gray, soft, silty and sandy clay and loose to medium dense silty and clayey sands with organic material and shell fragments. Bay deposits are generally expected to be up to 15 or more feet thick and extend below the groundwater. Loose, saturated, granular bay deposits may be susceptible to liquefaction and seismically induced settlement and loose or soft sediments may not possess adequate bearing capacity for deep foundations.

#### **Terrace Deposits (Bay Point Formation, Map Symbol Qt)**

Quaternary-age terrace deposit sediments mapped by Kennedy (1975) as Bay Point Formation are present in the Midway and Loma Portal areas, on portions of the Naval Training Center, and in the higher elevations of Old Town. Terrace deposits generally underlie the fill materials and bay and estuary deposits at depth, but are exposed in several areas around Loma Portal. In general, the terrace deposits are composed of yellowish to reddish and light brown, moist to saturated, medium dense to dense, fine to medium sand with varying amounts of silt and clay. The terrace deposits may also be present as weakly cemented sandstone with local fossiliferous or concretion-bearing sandstone beds.

Terrace deposits are generally not susceptible to liquefaction or seismically induced settlement. They commonly possess sufficient bearing capacity to support deep foundations, and are readily excavatable. Terrace deposits at the site generally do not form steep, instability-prone slopes.

### **Mount Soledad Formation (Map Symbol Tm)**

Materials of the Eocene-age Mount Soledad Formation underlie the terrace deposits in several areas around Midway High School and Cabrillo Hospital (Figure 2), and are generally only exposed in cut slopes. Deposits of the Mount Soledad Formation are described as consisting generally of light brown, weakly cemented, fine- to medium-grained sandstone and cobble conglomerate. The conglomerate content of the formation is variable to the southeast where it is locally composed entirely of medium-grained sandstone.

### **Agricultural Soils**

From an agricultural perspective, the project site is underlain by Urban Land (USDA, 1973). Urban Land is land that is primarily covered by buildings, streets, sidewalks, etc. Accordingly, the project will not result in the loss of agricultural soils.

### **Mineral Resources**

Our evaluation has indicated that no significant economic mineral resources have been discovered within the limits of the project study area. Therefore the potential for loss of mineral deposits due to further development of the study area is considered low.

### **Groundwater**

Based on our review of existing subsurface information, the depth to groundwater is expected to occur near mean sea level for much of Quadrants A and B, and for the low-lying portions of Quadrants C and D. Shallow groundwater is expected to be a constraint to construction over the majority of the site and should be evaluated on a case-by-case basis.

### **Surface Water**

Surface water is present in San Diego Bay and in the San Diego River channel. The River channel is influenced by tidal fluctuations and may range from nearly dry in the eastern portions of the study area to as much as 20 feet deep in the Mission Bay entrance channel. The San Diego River Channel may be expected to contain large volumes of water from the surrounding watershed during wet years. The northern terminus of the San Diego Bay channel is approximately 23 feet deep at its deepest point.

## **GEOTECHNICAL HAZARDS**

Geotechnical hazards potentially impacting the study area include slope instability, expansive soils, faulting and seismicity (including strong ground motion and ground surface rupture), liquefaction and seismically induced settlement. These potentially hazardous geologic conditions are discussed in the following sections. Areas with potential geotechnical hazards are presented on Figure 3.

### **Landsliding and Slope Instability**

Based on our review of published geologic maps and stereoscopic aerial photographs, as well as our site reconnaissance, no deep-seated landslides were observed at the site. In

addition, deep-seated landslides are not expected to impact the site based on the published and observed geologic and engineering properties of the mapped formational units at the site. However, an area surficial slope instability was noted in a previous geotechnical evaluation (Ninyo & Moore, 1998) southwest of Midway Avenue, and south of Wing Street located in the southwestern portion of the Quadrant C. This slope is approximately 20 feet high and 100 feet long. The slope has an inclination of approximately 1:1 (horizontal:vertical). An approximately 3-foot high masonry block retaining wall is located at the toe of the slope. Materials of the Mount Soledad Formation comprise the slope and are generally highly weathered. At the time of our reconnaissance, recent surficial sloughing was evidenced by the presence of a near vertical scarp approximately 2 feet in height and 20 feet long, located mid-way up the slope face. The slope is generally vegetated with grasses and ice plant, except in areas of the noted vertical scarp, where no vegetation was present.

### **Expansive Soils**

Soils with a high expansion potential increase in volume with the addition of water. Soil expansion can be detrimental to foundations, concrete slabs, flatwork, and pavement. Expansive soils have been reported to be present in local areas throughout the study area. Evaluation of on-site soils for expansion potential should be performed as a portion of the geotechnical evaluation for proposed developments on a case-by-case basis.

### **Faulting and Seismicity**

The project site is considered to be in a seismically active area, as is most of southern California. Based on our review of the referenced reports, geologic maps, and stereoscopic aerial photographs, as well as on our geologic field mapping, a small portion of the project site is underlain by known active fault splays (i.e., faults that exhibit evidence of ground displacement during the last 11,000 years). The approximate locations of nearby major faults relative to the site are shown on Figure 4.

In general, hazards associated with seismic activity include strong ground motion, ground surface rupture, liquefaction, and seismically induced settlement. These potential hazards are discussed in the following sections.

#### **Active Faults**

Segments of the Rose Canyon fault zone (the Mission Bay fault, and the Old Town fault) are known to cross the northeasterly portion of Quadrants A and B. The fault zone extends in an approximately north-south direction, roughly paralleling Interstate 5 along the eastern boundary of the study area. The locations of the fault traces and the fault buffer zones are shown on the Geotechnical Map (Figure 3).

Portions of the Rose Canyon fault zone are mapped by the State of California as being in an Earthquake Fault Zone. The site itself is not mapped in an Earthquake Fault Zone (CDMG, 1991a and 1991b). The City of San Diego, however, recommends the Rose Canyon Fault zone fault be treated as “active,” and the current standard-of-care within the San Diego area would require, for projects located within the Rose Canyon fault zone, trenching studies to address possible “active” faulting or other investigations to evaluate recency of fault movement. Reports should be prepared in accordance with the

most recent edition of the City of San Diego “Technical Guidelines for Geotechnical Reports” (City of San Diego, 1998). The City of San Diego may not permit development along the mapped trace of the fault, and may require a setback of 50 feet for structures for human occupancy.

**Potentially Active Faults**

The main trace of the Point Loma fault is mapped by Kennedy (1975) crossing the western portion of Quadrant A of the study area in a generally northwest-southeast direction. This portion of the Point Loma fault is not mapped on the current San Diego Seismic Safety Study (City of San Diego, 1995). Other portions of the fault are mapped as being potentially active by the City of San Diego, but are outside of the project area. Based on current knowledge, the fault is considered potentially active.

**Strong Ground Motion**

Based on a Probabilistic Seismic Hazard Assessment for the Western United States, issued by the United States Geological Survey (1999), the project area is located in a zone where the horizontal peak ground acceleration having a 10 percent probability of exceedance in 50 years ranges from 0.32g (32 percent of the acceleration of gravity) to 0.33g. The requirements of the governing jurisdictions and applicable building codes should be considered in the design of the project. The closest known active fault is the Rose Canyon fault zone located in the northeastern portion of the study area. The Rose Canyon fault has an assigned maximum earthquake magnitude of 6.9 (California Division of Mines and Geology, 1998).

**Ground Surface Rupture**

Based on the existence of traces of the Rose Canyon fault zone in the northeastern portion of the site and the proximity of the entire project site to the Rose Canyon fault zone, specifically the active Old Town, and Mission Bay faults, surface rupture at the subject site should be considered a possibility. The locations of mapped traces of the Rose Canyon fault zone and the fault buffer zones are presented on Figure 3. Lurching or cracking of the ground surface as a result of nearby seismic events should also be a consideration.

**Liquefaction and Seismically Induced Settlement**

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils and non-plastic silts that are saturated by a relatively shallow groundwater table are most susceptible to liquefaction.

Our evaluation has indicated that the majority of the project area is underlain by relatively loose to medium dense granular soils and a near-surface groundwater table. Based on the presence of these conditions and the possible seismic accelerations, the potential for liquefaction or seismically induced settlement in these areas should be considered relatively high. Areas potentially subject to liquefaction are presented on Figure 3. Based on City of San Diego (1995) significance determination guidelines, relatively high liquefaction potential is considered a significant constraint to development.

## CONCLUSIONS

Based on the results of our geologic reconnaissance and limited geotechnical evaluation, it is our opinion that the Bay-to-Bay Link redevelopment and revitalization project is feasible from a geotechnical perspective. However, based on our review of geotechnical reports by others, published geologic maps and aerial photographs, and our site reconnaissance, there are several significant constraints to development. Active traces of the Rose Canyon fault zone have been mapped within the northeastern portion of the study area and the potentially active Point Loma fault is located within the western portion of the study area. The project area may potentially be subject to strong ground shaking and ground surface rupture by an earthquake along the Rose Canyon fault zone. Most of the study area may be subject to liquefaction. Some of the slopes in the project area may be prone to slope instability.

The majority of the site is underlain by hydraulic fill material or municipal landfills (as described in Section 5.2.1) and contains a shallow groundwater table. Fill material may be subject to settlement caused by future development. Excavation in the majority of the site should be readily accomplished, however, dewatering of excavations and the potential for encountering unsuitable fill materials is very high.

We recommend that a comprehensive geotechnical evaluation, including development-specific subsurface exploration and laboratory testing, be conducted prior to design and construction of any developments in the study area. The purpose of subsurface evaluation would be to 1) further evaluate the subsurface conditions in the area of the proposed structures; 2) provide specific data on potential geologic and geotechnical hazards, and 3) provide information pertaining to the engineering characteristics of earth materials at the project site. From these data, recommendations for grading/earthwork, surface and subsurface drainage, temporary and/or permanent dewatering, foundations, pavement structural sections, and other pertinent geotechnical design considerations may be formulated.

Although generally low-lying, the proposed channel of the Bay-to-Bay Link waterway will be extending through areas with as much as 10 to 15 feet of elevation above sea level at the ground surface. The channel will, correspondingly, be surrounded by slopes cut into fill soils and bay deposits that will require evaluations for slope stability and erosion control. Unsuitable and/or contaminated material may also be encountered during excavation of the channel.

### **Geotechnical Constraints and Possible Mitigation Measures**

In our opinion, the following geotechnical factors should be considered in the planning and implementation of the project. The principal constraints and possible mitigation measures are summarized in the following section. Geological and geotechnical constraints include the following:

- The earth materials along the proposed alignment of the boat channel are readily excavatable with conventional excavating and dredging equipment. However, special consideration should be taken to evaluate the proposed excavation slopes for hazards associated with slope instability including saturated, cohesionless, running sands; shallow slope failures; and distress to surrounding improvements. The relocation of numerous utilities would also be a significant constraint.
- The presence of loose granular soils and the shallow depth of groundwater underlying large portions of the study area increases the likelihood of liquefaction and dynamic settlement occurring in the event of strong ground shaking. Based on City guidelines, the

relatively high potential for liquefaction is a significant constraint. Mitigation measures for liquefiable soils include ground modification, such as dynamic compaction, or the use of deep foundations. We expect that structures with the exception of light, single-story structures will be founded on some type of deep foundation system, such as driven piles embedded into underlying competent formational materials, in areas where liquefaction is a concern.

- Based on our review of background geotechnical data, expansive soils underlie portions of the study area. Expansive soils can be detrimental to structures and pavement if not properly mitigated. Mitigation measures include remedial grading including removal and recompaction with nonexpansive soils, as well as moisture conditioning and/or chemical treatment.
- Based on our review of background geotechnical data, fill soils underlie portions of the project area. Areas underlain by fill soils, particularly those areas with a high potential for liquefaction, will likely need to have multi-level structures be supported on deep foundations. We recommend that the settlement potential of these soils be evaluated as part of the geotechnical design phase. Mitigation measures, if needed, may include remedial grading or surcharging and monitoring by means of settlement monuments.
- Potentially corrosive soils may be present at the site. We recommend that the corrosive characteristics of the soils be evaluated as part of the geotechnical design phase. In addition, we recommend that the steel reinforcement of the structures be protected from the corrosive effects of such an environment. Special concrete designs may be required.
- Based on review of background data, a large portion of the Quadrant B and the northern boundary of Quadrant A of the study area are underlain by former municipal landfills. Soil settlement in the landfill areas may be expected and the area should be properly zoned to ensure settlement-sensitive structures are not planned. The generation of methane gas from the landfill should also be considered.
- Based on our review of the referenced background information, active faults underlie a portion of the project site. Based on the current standard-of-care for the San Diego region, we would recommend, in areas within the Rose Canyon fault buffer zones (as presented in Figure 3), some type of fault evaluation for each human-occupancy structure (a structure intended for 2,000 or more human occupancy hours per year) that demonstrates that there are no active faults below the structure. Such an evaluation might include analysis of subsurface data obtained during the design phase of the project relative to faulting.
- Based on the data presented in Section 6.3.3, the potential for strong ground motions to occur at the site is significant. In addition, San Diego has been upgraded to a UBC Seismic Zone 4, the zone represented by the highest potential for strong ground motions. Accordingly, the potential for relatively strong seismic accelerations will need to be considered in the design of proposed improvements.
- Based on the presence of a potentially shallow groundwater table in portions of the project area, temporary dewatering during construction may be needed for subterranean